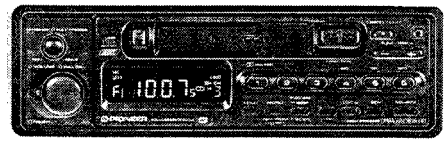
PIONEER
The Art of Entertainment

Service Manual

• KEH-M4500SDK/WG



ORDER NO.
CRT1473

MULTI-CD CONTROL FM/MW/LW TUNER DECK AMPLIFIER

KEH-M4500SDK WG
KEH-M4000SDK WG
KEH-M4500 EW, IT
KEH-M4000 EW, IT

NOTE:
- **See the separate manual CX-197 (CRT1328) for the cassette mechanism description.**
- **Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.**

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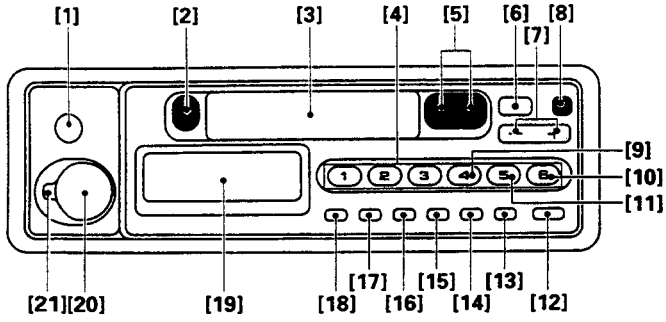


Fig. 1

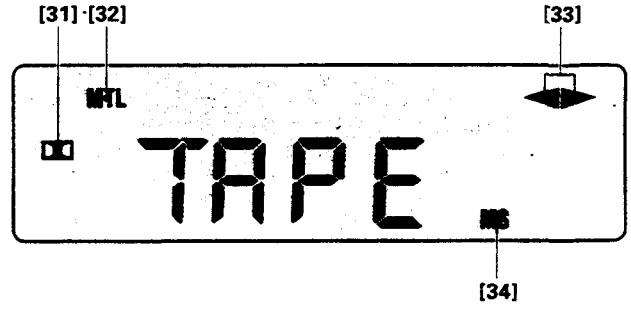


Fig. 3

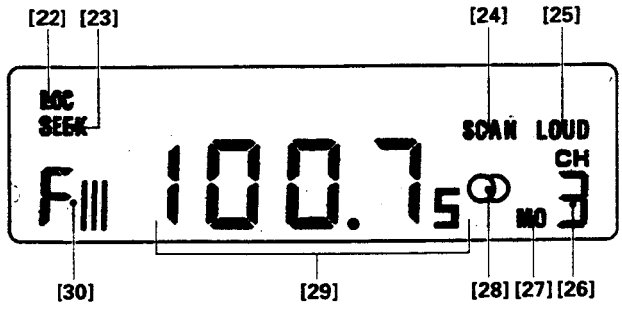


Fig. 2

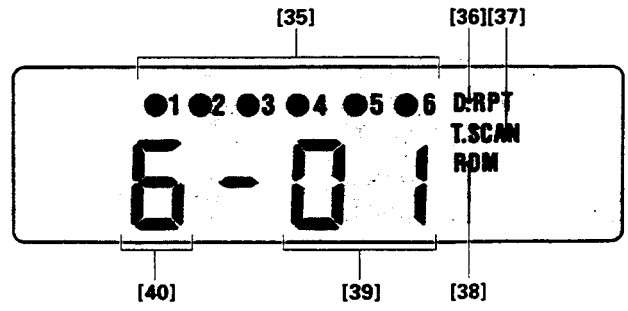


Fig. 4

1. USING THE REMOVABLE FRONT PANEL

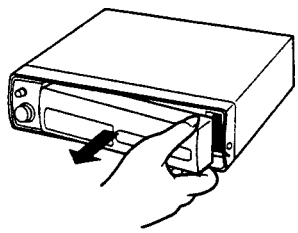
The front panel of this unit can be removed to prevent theft.

Parts Identification (Fig. 1)

[2] Eject
[5] Fast Forward, Rewind/Direction Change
[8] Detach button

Detaching the Front Panel

1. Press button [8], and the right-hand side of the panel will eject.
2. To remove the front panel, pull its right-hand side toward you.



- Take care not to put pressure on the display or drop the front panel.

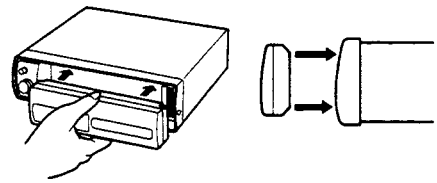
Optional Protective Case

A separately sold protective case [AD-931] is available for the detached front panel. This case is highly recommended to protect the front panel from shocks and scratches.

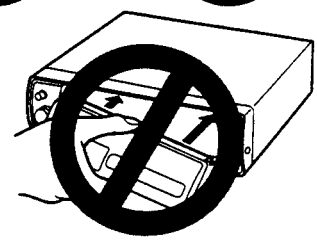
Replacing the Front Panel

Push the front panel into the main body.

- When replacing the front panel, do not put pressure on the display or control buttons.



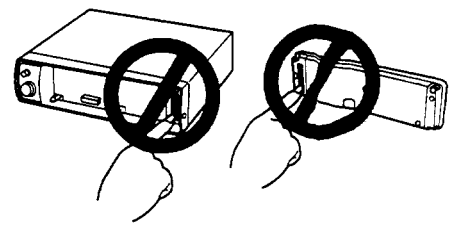
- Install the front panel holding it parallel to the main unit. Installing the panel tilted, as shown in the illustrations below, may cause the hook on the front panel to destroy the main unit's electrodes.



- Do not install the front panel while holding down buttons [2], [5] and [8] in Fig.1. Doing so may destroy the buttons and the main unit.
- Note that if the front panel is not attached correctly, pushing button [8] may not release the panel, and the other control buttons may not function.

Precautions

- Do not touch the contacts on the front panel or on the unit body, since this may result in poor electrical contact. If dirt or other foreign substances get on the contacts, wipe them with a clean, dry cloth.

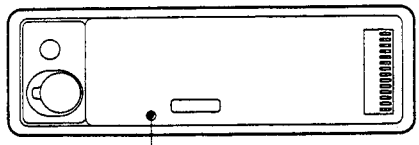


Precautions When Handling the Front Panel

- Do not leave the front panel in any area exposed to high temperatures or direct sunlight.
- Do not drop the front panel or otherwise subject it to strong impact.
- Do not allow such volatile agents as benzine, thinner, or insecticides to come into contact with the surface of the front panel.
- Never try to disassemble the front panel.

2. USING THE CLEAR BUTTON

- The clear button can be located on the unit after you have removed the front panel. Refer to the previous page to find out how to remove the front panel.



[41] Clear Button

Once all wiring is complete, press button [41] with a thin, pointed object. Though not a normal occurrence, the microprocessor which controls the operation of this unit can be affected by electrostatic noise. This generally is indicated by such symptoms as no power being supplied when you switch the unit on, failure of buttons and controls, or an abnormal display. Should this happen, press button [41] with a thin, pointed object to reset the microprocessor.

3. ADJUSTING VOLUME AND TONE

Parts Identification (Fig. 1)

[1] Bass/Treble
[2] Eject
[3] Cassette Door
[12] Source Selector
[18] Loudness
[19] Display
[20] Volume/Balance
[21] Fader

Switching Power On

Tape

- GEH-M2000 does not include this tape deck function.

Insert the cassette tape through the Cassette Door [3], and the power will be automatically turned on to get the tape start being played back. To eject the tape, press the button [2].

Radio, Multi-play CD player

The unit incorporates priority cassette tape play. The unit will not switch to radio or multi-play CD player while a tape is inserted. Press button [2] to eject the tape.

- GEH-M2000 does not include tape deck function. Therefore, procedures mentioned above will not be necessary.

Press button [12] to switch the radio on. Press button [12] a second time to switch it off. When combind with the separately available multi-play CD player (CDX-M30, etc.), the unit will switch in the follwing order:
Multi-play CD player — Radio — OFF.

- Inserting a tape while listening to either the multi-play CD player or radio will switch the unit to tape play.

Adjusting Audio

Adjusting Volume

Turn the control [20] to the right to raise the volume. Turn the control to the left to lower the volume.

Adjusting the Fader

Turn the control [21] upward to fade sound in the rear speakers. Turn the control downwards to fade sound in the front speakers.

- With a 2 speaker system, set the control in a central position.

Adjusting Bass

Turn the control [1] to the right to increase bass. Turn the control to the left to decrease bass.

Adjusting Treble

Pull the control [1] towards you until it clicks. Turn the control to the right while it is in this position to increase treble. Turn it to the left to decrease treble. After adjusting the control, push it back to its original position.

Adjusting Balance

Pull the control [20] towards you until it clicks. Turn the control to the right while it is in this position to fade sound in the left speaker. Turn it to the left to fade sound in the right speaker. After adjusting the control, push it back to its original position.

Using the Loudness Function

Press button [18] and the "LOUD" indicator will appear on the display. This "loudness" function enhances both the high and low ranges of sound to give even more power to output even at low volumes.

4. USING THE RADIO

Parts Identification

(Fig. 1)

[4] Preset
[6] Band
[7] Tuning/Local Seek Sensitivity/Seek, Manual
[12] Source Selector
[13] Best Stations Memory (BSM)
[14] Local Station
[16] Preset Scan
[17] FM Stereo/Mono
[19] Display

(Fig. 2)

[22] Local Station
[23] Seek
[24] Preset Scan
[26] Preset Number
[27] FM Mono
[28] FM Stereo
[29] Frequency
[30] Band

Listening to the Radio

• **Electronic Tuner**

Frequency allocation differs depending upon the area. This unit has been designed in accordance with the frequency allocations for Western Europe, Asia, the Middle and Near East, Africa, Australia and Oceania. Use in other areas may result in improper reception of AM.

KEH-M4500, KEH-M4000

The unit incorporates priority cassette tape play. The unit will not switch to radio play while a tape is inserted, so be sure to eject the tape when you wish to listen to the radio.

1. Press button [12] to switch the radio power on.

Press button [12] to switch the tuner on and off. Oprerations will be different when the unit is combined with a seperately available multi-play CD player (CDX-M30, etc.). For details on "Switching Power ON" refer to the relevent clause, on page 3.

2. Press button [6] to select a band.

F I → F II → F III → M/L
(FM1) (FM2) (FM3) (MW/LW)

Use Button [7] to switch betwen MW (531 — 1,602 kHz) and LW (153 — 281 kHz).

3. Use seek tuning to tune in a frequency.

Confirm that the SEEK indicator [23] is shown on the display (if not, press the (+) and (–) sides of button [7] at the same time). Press the (+) side of button [7] to automatically tune in the next higher receivable frequency, and the (–) side for a lower frequency.

4. Adjust volume and tone (see page 3).

5. Assign the tuned frequency to one of the buttons in Bank [4] (preset memory).

Press and hold down one of the button in Bank [4] for at least two seconds. The frequency is assigned to the selected button when the preset number [26] stops flashing on the display. Up to 18 FM stations (6 each for FM1, FM2 and FM3), and six MW/LW stations can be assigned to the preset memory buttons in Bank [4].

6. Once a frequency is assigned to a button in Bank [4], you just need to press that button to tune it in.

This also causes the number of the button pressed to appear at position [26] on the display.

BSM (Best Stations Memory)

This function automatically locates stronger stations and automatically assigns their frequencies to the buttons in Bank [4], from strongest to weakest. It comes in handy when trying to find local stations while driving.

1. Press button [6] and select a band.
2. Holding down button [13] for about two seconds will start BSM search. At this time, "BSM" will flash on the display.
3. The frequency display will return once BSM search is complete, and frequencies are assigned to buttons 1 through 6 in Bank [4].

- At the end of the BSM search, the displayed frequency is that assigned to button ① of Bank [4].
- If there are fewer than six strong stations in the area, some of the buttons in Bank [4] will not be assigned frequencies, so they will retain any frequencies assigned to them previously.
- BSM search may take as long as 30 seconds in areas where there are few strong stations.
- You can cancel BSM search by pressing button [13] again.

Preset Scan Tuning

This function lets you automatically monitor the stations assigned to the preset buttons.

1. Press the button [16], and "SCAN" [24] will light up and the preset number [26] flash.
   Each station assigned to the buttons in Bank [4] will be automatically tuned in for about eight seconds.
2. When you hear a station that you like, press button [16] again to cancel preset scan tuning and remain at that station.

Adjusting Seek Sensitivity

The seek tuning function of this tuner lets you select between a local setting for reception of strong stations only, and a DX (distant) setting for reception of weaker stations. The local setting also has four seek tuning sensitivity levels for FM and two levels for MW/LW to match local conditions.

Changing the Local Seek Sensitivity

1. Use button [6] to select a band.
2. Hold down the button [14] for more than two seconds, and the display will show you the current local seek sensitivity for about five seconds.
3. While the local seek sensitivity remains on the display, press the (+) side of button [7] to increase the sensitivity level, and the (–) side to decrease the level as shown below.
   FM : L-1 = L-2 = L-3 = L-4
   MW/LW: L-1 = L-2

The L-4 setting allows reception of only the strongest stations, while lower settings let you receive progressively weaker stations.

- The display of local seek sensitivity returns to the frequency when about 5 seconds have elapsed after the change of sensitivity.

Switching between Local and DX

Press button [14] to switch between Local and DX (distant) seek tuning.
When "LOC" [22] is shown on the display, seek tuning is performed with the local seek sensitivity. Otherwise, seek tuning is performed with the DX seek sensitivity.

Manual Tuning

Use manual tuning when stations are too weak to be picked up by seek tuning.

1. Press both (+) and (–) sides of button [7] at the same time to clear "SEEK" [23].
2. Each press of the (+) side of button [7] increases the frequency in 50 kHz steps in the FM band, 9 kHz in the MW band and 1 kHz in the LW band. Pressing the (–) side of button [7] decreases the frequency. Holding down either side of button [7] changes the frequency at high speed.

Switching between FM Stereo and Mono

Generally, it is best to allow the ARC (Automatic Reception Control) function to automatically set the optimum listening conditions. When stereo broadcasting is received, "◯" [28] will appear on the display. When there is a large amount of noise, you can press button [17] for clearer mono reception ("MO" [27] will appear on the display).

5. USING THE TAPE DECK

GEH-M2000 does not include this tape deck function.

Parts Identification

(Fig. 1)

[2] Eject
[3] Cassette Door
[5] Fast Forward, Rewind/Direction Change
[9] Music Search (KEH-M4500)
[10] Metal (KEH-M4500)
[11] Dolby B NR (KEH-M4500)
[19] Display

(Fig. 3)

[31] Dolby B NR (KEH-M4500)
[32] Metal (KEH-M4500)
[33] Direction
[34] Music Search (KEH-M4500)

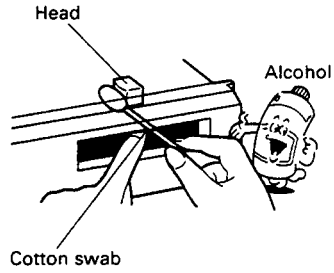
About cassette tapes

- Do not use tapes longer than C-90-type (90 min.) cassettes. Longer tapes can interfere with tape transport.
- Storing cassettes in areas directly exposed to sunlight or high temperatures can distort them and subsequently interfere with tape transport.

- Store unused tapes in a tape case where there is no danger of them becoming loose or being esposed to dust.

Cleaning the head

If the playback head becomes dirty, sound quality will suffer. Periodically (once or twice a month) clean the head with a cotton swab soaked with alcohol.



Listening to a tape

1. Insert the cassette tape into the slot [3], and power will be turned on and the tape begin being played back.

At this time, the tape running direction indicator [33] will light up.

2. Adjust volume and tone (see page 3).

3. To eject the cassette tape, press the button [2].

- Be sure to eject the tape when the front panel is removed, or the vehicle's ignition is turned OFF. Leaving the tape in the unit can deform the pinch roller causing wow and flutter during tape playback.
- A loose or warped label on a cassette tape may interfere with the eject mechanism of the unit or cause the cassette to become jammed in the unit. Avoid using such tapes or remove such labels from the cassette before attempting use.
- Do not try to eject the cassette immediately after insertion, as it will cause malfunction. Wait a few seconds.

Changing Program

Push the fast forward and rewind buttons [5] together to switch from one side of the tape to the other (from Side A to Side B or vice versa).

Using Fast Forward and Rewind

Since the transport can be in either direction, both the left and right high-speed tape transport buttons [5] can be regard as fast forward/rewind buttons. For fast forward, press the high-speed tape transport button [5] that corresponds to the direction that is shown by the direction indicator [33]. When the end of the tape is reached, playback will automatically begin from the opposite side of the tape (Auto-reverse). For rewind, press the button [5] that is opposite that of the direction shown by the direction indicator [33]. When the end of the tape is reached, playback will automatically begin from the beginning of the same side of the tape (Auto-replay).

When you release fast forwad/rewind, lightly press button [5] located on the opposite side of the one you pressed to fast foward or rewind.

- "◀▶" [33] will flash when the tape is fast forwarding or rewinding.

Using Music Search (KEH-M4500)

Returning to the beginning of selection A

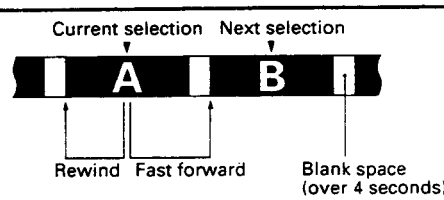
Press the button [9] ("MS" [34] appears) and then the high-speed tape transport button [5] for the direction opposite that is shown by the direction indicator [33]. Playback will automatically start from the beginning of selection A.

Moving from selection A to selection B

Press the button [9] ("MS" [34] appears) and then the high-speed tape transport button [5] that corresponds to the direction shown by the direction indicator [33]. Playback will automatically start from the beginning of selection B.

To enable regular fast forward/rewind operations, press the button [9] again ("MS" [34] turns off) to turn the function OFF. The following errors will cause the music search function to operate improperly, even though the unit is not malfunctioning.

- Unrecorded "blank" portions between selections less than 4 seconds — the blank portion cannot be detected by the unit.
- Pauses in recorded conversations longer than 4 seconds — the unit reads these as blanks between selections.
- Portions recorded at very low volume for more than 4 seconds — the unit reads these as blanks between selections.



Dolby B NR (KEH-M4500)

To hear a tape recorded using a Dolby NR system, press the button [11]. ("DD" [31] appears.)

Tape Selector (KEH-M4500)

When using metal tapes and chrome tapes, press button [10]. ("MTL" [32] appears.)

Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
"DOLBY" and the double-D symbol DD are trademarks of Dolby Laboratories Licensing Corporation.

6. PLAYING COMPACT DISCS

Precautions When Using the Multi-Play CD Control

- This model can be used as controller when an optionally available multi-play CD player (e.g., CDX-M30) is included in the system. Programmed play does not operate when used with the multi-CD player CDX-M70 or CDX-M100.
- See pages **6** through **7** for details on operation procedures.
- The Owner's Manual for the multi-play CD player does not contain an explanation of the CD controls for this unit. Read this Owner's Manual for details on proper operation and keep it handy for later reference.
- Immediately after the multi-play CD player is connected to the system, it may not operate properly. In this case, press the clear button of the main unit and the clear button of the multi-play CD player, and attempt operation again.

The Magazine Type Multi-Play CD players with ⓂⓂⓂⓂ mark and the Mazazines with the same mark are compatible for 5-inch (12 cm) discs.

Listening to the Compact Disc

Parts Identification

(Fig. 1)

[4] Disc Number search
[6] Program Clear
[7] Track Number Search/Fast Forward, Reverse
[12] Source Selector
[15] ITP (Instant Track Program)
[16] Highlight Scan
[17] Mode
[19] Display

(Fig. 4)

[35] Disc
[36] Music Repeat/Disc Repeat
[37] Highlight Scan
[38] Random Play
[39] Track Number
[40] Disc Number

KEH-M4500, KEH-M4000

The unit incorporates priority cassette tape play. The unit will not switch to multi-play CD player while a tape is inserted, so be sure to eject the tape when you wish to listen to CD play.

1. Press button [12] to change the display to the Multi-Play CD player mode and to begin disc play.

Each press of button [12] changes the mode as follows: Multi-Play CD player — tuner — OFF

2. Use the Disc Number Search function to select a disc.

Select the desired disc by pressing one of the buttons in Bank [4]. The number of the disc selected appears at position [40] on the display.

- Display [35] indicates whether the magazine is loaded or empty.
- If the number at position [40] on the display does not change when you press a button in Bank [4], it means that there is no disc loaded in that tray.

3. Use Track Number search to select a track.

Confirm that Track Number is shown at Position [39] on the display. If not, press the (+) and (–) sides of button [7] at the same time. Press the (+) side of button [7] to increase the number at Position [39], or the (–) side to decrease the number. Holding either side of button [7] down changes the track number at high speed.

4. Adjust volume and tone (see page 3).

5. To stop disc play, press button [12].

At another press, the normal play resumes from about where it stopped.

- If you stopped operating a Multi-Play CD Player CDX-M100 in the middle of music and then restarted, the player resumes playing from the very beginning of the selection with which you stopped.

Note:

- After you press a button in Bank [4], it may take some time before play begins due to the time necessary to load and set the disc in the mechanism.

- This indicator HHHH flashes on the display and playback is automatically cut when the temperature around the multi-play CD player becomes too high. This protects the laser mechanism from serious damage. Listen to the radio unit the temperature returns to normal. (This functions only when your unit is used with a Multi-Play CD player CDX-M100.)

Using Highlight Scan

Highlight Scan is designed to enable you to conveniently scan all pieces of music contained in the disc by playing 10 seconds each at your designated point of time after the start of the music. The starting time of play is set at one minute in factory. Therefore, the Highlight Scan begins one minute after the start unless you designate it otherwise.

When you do not want to change the factory-set time:

- When used in conjunction with the old type Multi-Play CD Players [CDX-M70] or [CDX-M100], the place where playback starts in Highlight Scan is fixed as the start of each track. Also, it is not possible to adjust this time setting.

1. Press button [16] ("T.SCAN" [37] appears).
2. The contained pieces of music will be played in sequence for 10 seconds each one minute after the beginning.
3. Press button [16] again when your selected piece comes, and it will continue to play. At this point, the Highlight Scan discontinues to operate.

- The previous function automatically resumes when a piece of music with which Highlight Scan began returns.

Changing the starting time of Highlight Scan

When you want to set the starting time of the Highlight Scan to 30 seconds:

1. Press button [7], (+) and (–) sides simultaneously, and time numerals will be displayed.
2. Keep pressing either (+) or (–) side of button [7] until the numerals reaches 30.
3. Hold down button [16] for two or more seconds, and "T.SCAN" [37] appears and the Highlight Scan will begin. 30 seconds after the start of the next piece of music.

- The starting time of Highlight Scan can be designated at ten or tens of seconds only. A tenth or tenths of seconds can be disregarded.
- If a piece of music ends before your designated point of time at which Highlight Scan starts, the scanning is performed for its beginning 10 seconds.
- If a piece of music lasts less than 10 seconds, so does the Highlight Scan.
- You may wish to change the starting time longer without suspending the function. You may do so, however, only to a relatively long-playing piece of music because, as a matter of course, the time cannot be set so as to come after the end of the music.

Using Disc Repeat, Music Repeat and Random Play

Each Press of button [17] causes the mode to change as follows:

Music Repeat ("RPT" [36] appears) — Random Play ("RDM" [38] appears) — Normal

If button [17] is pressed for 2 or more seconds, the mode changes to Disc Repeat ("D.RPT" [36] appears).

- When Disc Repeat or Music Repeat are not operational, the compact discs contained in the magazine will play sequentially from beginning to end, and then start from disc 1 again.

Music Repeat

1. To repeat the music you are listening to, select the repeat mode ("RPT" [36] appears).
2. To cancel music repeat, press button [17] to turn off "RPT" [36].

Random Play

1. To play music randomly, select the random play mode ("RDM" [38] appears). Once the current track has been played, the microprocessor will randomly select the next and subsequent tracks.
2. To cancel random play, press button [17] to turn off "RDM" [38].

- Since selections are played in random order, the same selection may be played twice in succession.
- When a Multi-Play CD Player CDX-M100 is used, random selection is made from a disc being played.

Disc Repeat
The Disc Repeat function causes the same disc to play repeatedly.
1. Press button [17] for 2 seconds or more while the desired disc is being played. The mode will change to Disc Repeat mode ("D.RPT" [36] appears).
2. To cancel Disc Repeat, again, press button [17] for 2 seconds or more and turn off "D.RPT" at [36].

Using Fast Forward and Reverse
1. Press simultaneously both (+) and (–) sides of the button [7]. At this time the display will show the amount of elapsed disc play time.
2. Press the (+) side of button [7] for fast forward, and the (–) side for reverse.
- Sound is output during fast forward and reverse operations.
- The display counts down the number of seconds between tracks if the spacing is rather large (–'00"–'01").

Using Program Play
This function lets you program the play sequence of all of the tracks contained on the compact discs loaded in the magazine.
- The ITP function will not operate when connected to either the CDX-M70 or CDX-M100.
- Up to 32 selections can be programmed for a single magazine.
- Up to 16 different magazines (max. 32 selections per magazine) can be programmed individually. If you program more than 16 magazines, old programs are automatically replaced by new ones.
- Automatic Magazine Program Selection (AMPS) retrieves the right program from the memory automatically, as soon as a preprogrammed magazine is loaded. Preprogrammed magazines are identified using the CD in the tray 1 of the magazine. Therefore be sure that tray 1 contains a disc.

Programming
1. While a disc is playing, select the desired disc and track you want to program.
2. Press button [15] to memorize the track being played. ("P-01" is indicated during the memory step.)
3. Procedures 1 and 2 above can be repeated until a maximum of 32 steps are programmed.
- If the 33rd step is selected, the "FULL" display will appear, indicating that no more selections can be programmed.
- When there are already a number of selections in the memory, the new selection will be added to the last step.

Playing Back the Program
1. Hold down button [15] for 2 seconds to begin play in the programmed sequence, while a disc is playing. ("PP01" is indicated during the step where the program is played.)
2. Press button [15] again to cancel program play.
- Pressing the (+) or (–) side of button [7] during programmed play makes it possible to search for a specific step number from among the programmed selections.
- Program play returns to the first step in the programmed sequence when it reaches the end of the program.
- When playing a magazine that has no program recorded, "PP00" will be displayed for approximately 3 seconds.

Erasing the Program
It is possible to erase one or all selections of the program in the magazine being played.

To erase a single selection:
1. Press the (+) or (–) side of button [7] during programmed play, and search for the specific step you wish to erase.
2. Press button [6] for at least 2 seconds and the selection being played will be erased.
- After the particular track has been erased, the tracks in the next position move from down up one notch in the order from the previous position.

To erase the entire program:
While a disc is playing, hold down button [6] for at least 2 seconds. All the programs in the magazine being played will be erased. ("P-CL" is indicated on the display.)

Error Mode
Should an abnormality occur — for example, Multi-Play CD Player cannot be operated, or the music stops during CD playback — the main unit will indicate an error mode. (Example: "E-11")
While it the unit is in error mode, a number will be displayed indicating the cause of the error, so please check the items listed below. If you cannot fix the problem after checking the cause of the error, please contact your dealer or your nearest Pioneer service center.

Note:
When using the Multi-Play CD Player, CDX-M100, CDX-M70, CDX-M50 and CDX-M40, an error will be displayed only in the form of "E-00", without the number which indicated the cause of the error. When this display appears, please check items 11, 12, 14, or 30 listed below.

Display	Cause	Treatment
11, 12	Dirt or a scratch on the disc stops the laser beam from being able to focus.	Wipe the dirt off the disc. Exchange the disc if it is scratched.
	The disc has been inserted upside down.	Confirm that the disc has been inserted right side up.
14	The disc has been inserted upside down.	Confirm that the disc has been inserted right side up.
	An unrecorded compact disc (CD-R), can be recorded on once is being used.	When you use a CD-R, load one that has been recorded on.
30	Dirt or a scratch on the disc hinders the track number search function.	Wipe the dirt off the disc. Exchange the disc if it is scratched.
80	An empty magazine is loaded in the multi-play CD player.	Insert a disc in the magazine.
10, 12, 50, 60, 70, A0	Electrical or mechanical system fault.	Turn the car ignition switch OFF, then ON again, or change to other sources except CD playback, and then to CD playback again. If the error indication does not disappear, contact your dealer or your nearest Pioneer service station.

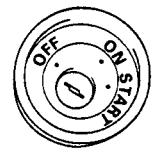
- When error numbers not mentioned above are indicated, refer to the owner's manual accompanying the multi-play CD player.

7. CONNECTING THE UNITS

Note:

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the owner's manual for details on connecting the various cords of the power amp and other units, then make connections correctly.
- Be sure to connect the memory power supply lead (orange) to a terminal that is always supplied with power regardless of the vehicle's ignition switch position. If this connection is made incorrectly or is forgotten, the unit will not work at all.
- Don't pass the orange lead through a hole into the engine compartment to connect to the battery. This will damage the lead insulation and cause a very dangerous short.
- Since a unique BPTL circuit is employed, never wire so the speaker leads are directly grounded or the left and right speaker ⊖ leads are common.
- Speakers connected to this unit must be high-power types possessing minimum rating of 30W and impedance of 4 to 8 ohms. Connecting speakers with output and/or impedance values other than those noted here can damage the speakers.
- When the unit is mounted in a vehicle whose ignition switch does not have the ACC (accessory) position as shown in Fig. 6, be sure to connect the red lead of the unit to the terminal controlled by the ignition switch ON/OFF position. If you do not, the vehicle battery may go flat when you leave your vehicle for several hours.

ACC position
Fig. 5



No ACC position
Fig. 6

(Fig. 7)

1. Power amp (sold separately)
2. Connecting cords with RCA pin plugs (sold separately)
3. Blue
4. Green
5. Gray
6. Green/black
7. Gray/black
8. Green/red
9. Gray/red
10. Front/left speaker
11. Front/right speaker
12. Rear/left speaker
13. Rear/right speaker
14. White
15. Red
16. Rear out
17. Antenna jack
18. Blue
    To system control terminal of the power amp or Auto-antenna relay control terminal (Max. 300 mA 12 V DC).
19. Fuse holder
20. Fuse resistor
21. Black (ground)
    To vehicle (metal) body.
22. Red
    To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
23. Orange
    To terminal always supplied with power regardless of ignition switch position.
24. Multi-play CD player terminal
25. Multi-play CD player (sold separately)
26. Use this for connections when you have the seperately available amplifier.
27. With a 2 speaker system, connect to the 2 speakers in the front or the rear.

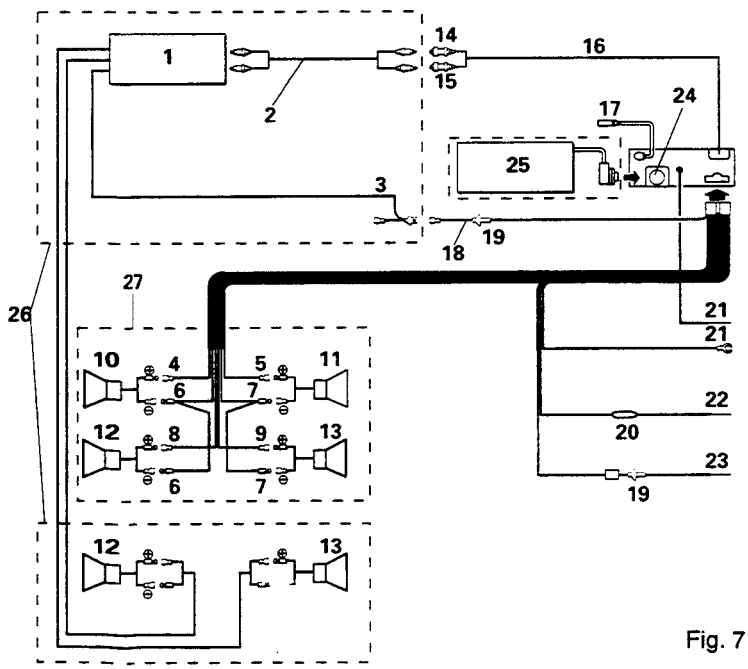


Fig. 7

8. SPECIFICATIONS (KEH-M4500/EW, KEH-M4000/EW)

General

Power source ..... 14.4 V DC (10.8 — 15.6 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 6 A
Dimensions (chassis) ..... 180(W) × 50(H) × 150(D) mm
(front face) ..... 188(W) × 58(H) × 18(D) mm
Weight
(KEH-M4500, KEH-M4000) ..... 1.4 kg
(GEH-M2000) ..... 1.0 kg

Amplifier

Maximum power output ..... 25 W × 2/15 W × 4 (EIAJ)
Continuous power output ..... 11 W × 2 (1% dist. at 1 kHz)
Load impedance ..... 4Ω (4 — 8Ω allowable)
Preout output level/output impedance
..... 500 mV/1 kΩ
Tone controls (bass) ..... ±10 dB (100 Hz)
(treble) ..... ±10 dB (10 kHz)
Loudness contour ..... +12 dB (100 Hz), +7 dB (10 kHz)
(Volume: -30 dB)

Tape player (KEH-M4500, KEH-M4000)

Tape ..... Compact cassette tape (C-30 — C-90)
Tape speed ..... 4.76 cm/sec. (+0.14 cm/sec., −0.05 cm/sec.)
Fast forward/rewind time ..... Approx. 100 sec. for C-60
Wow & flutter ..... 0.13% (WRMS)
Frequency response
(KEH-M4500) ..... Metal: 40 — 17,000 Hz (±3 dB)
(KEH-M4000) ..... 40 — 14,000 Hz (±3 dB)
Stereo separation ..... 45 dB
Signal-to-noise ratio
(KEH-M4500) ..... Metal: Dolby B NR IN: 63 dB (IEC-A network)
Dolby NR OUT: 55 dB (IEC-A network)
(KEH-M4000) ..... 52 dB (IEC-A network)

FM tuner

Frequency range ..... 87.5 — 108 MHz
Usable sensitivity ..... 11 dBf (1.0μV/75Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 16 dBf (1.7μV/75Ω, mono)
Signal-to-noise-ratio ..... 70 dB (IEC-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 — 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

MW tuner

Frequency range ..... 531 — 1,602 kHz
Usable sensitivity ..... 18μV (25 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

LW tuner

Frequency range ..... 153 — 281 kHz
Usable sensitivity ..... 30μV (30 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

9. DISASSEMBLY

- Removing the case

1. Insert and turn a pair of tweezers at locations indicated by arrows to remove the case.

- Removing the grille assy

1. Press the detach button, and then pull grille assy.

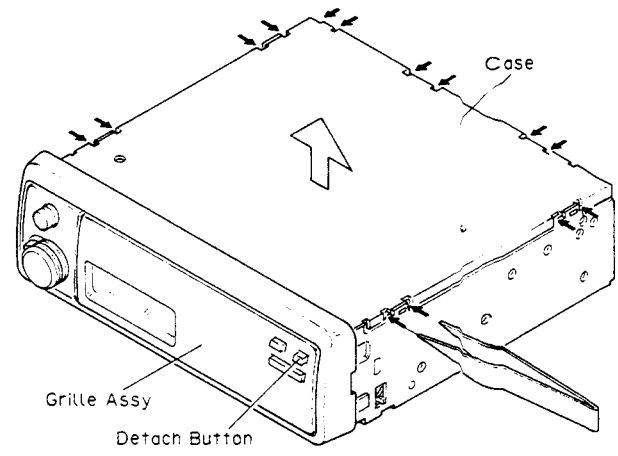


Fig. 8

• Removing the cassette mechanism assy

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the cassette mechanism assy.

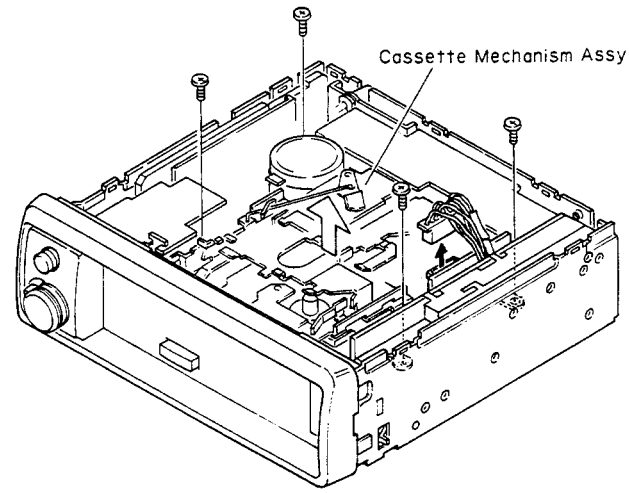


Fig. 9

• Removing the panel assy

1. Disconnect a connector.
2. Remove the three knobs.
3. Press tabs at four locations indicated by arrows.
4. Remove the panel assy.

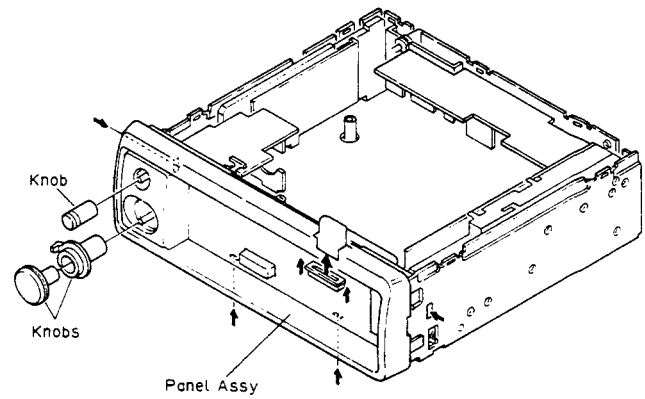


Fig. 10

• Removing the chassis unit

1. Remove the eight screws.
2. Unbend the claw indicated by arrow until straight.
3. Remove the chassis unit.

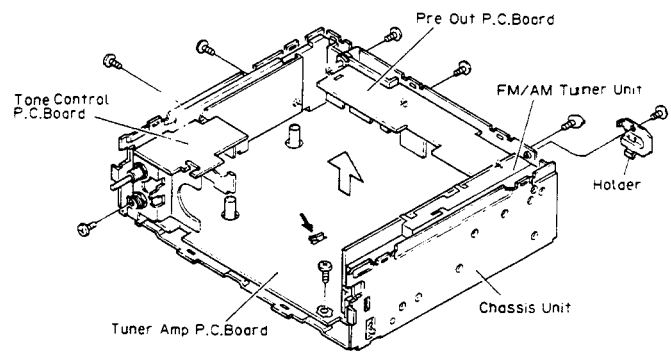


Fig. 11

10. BLOCK DIAGRAM

● KEH-M4500SDK/WG

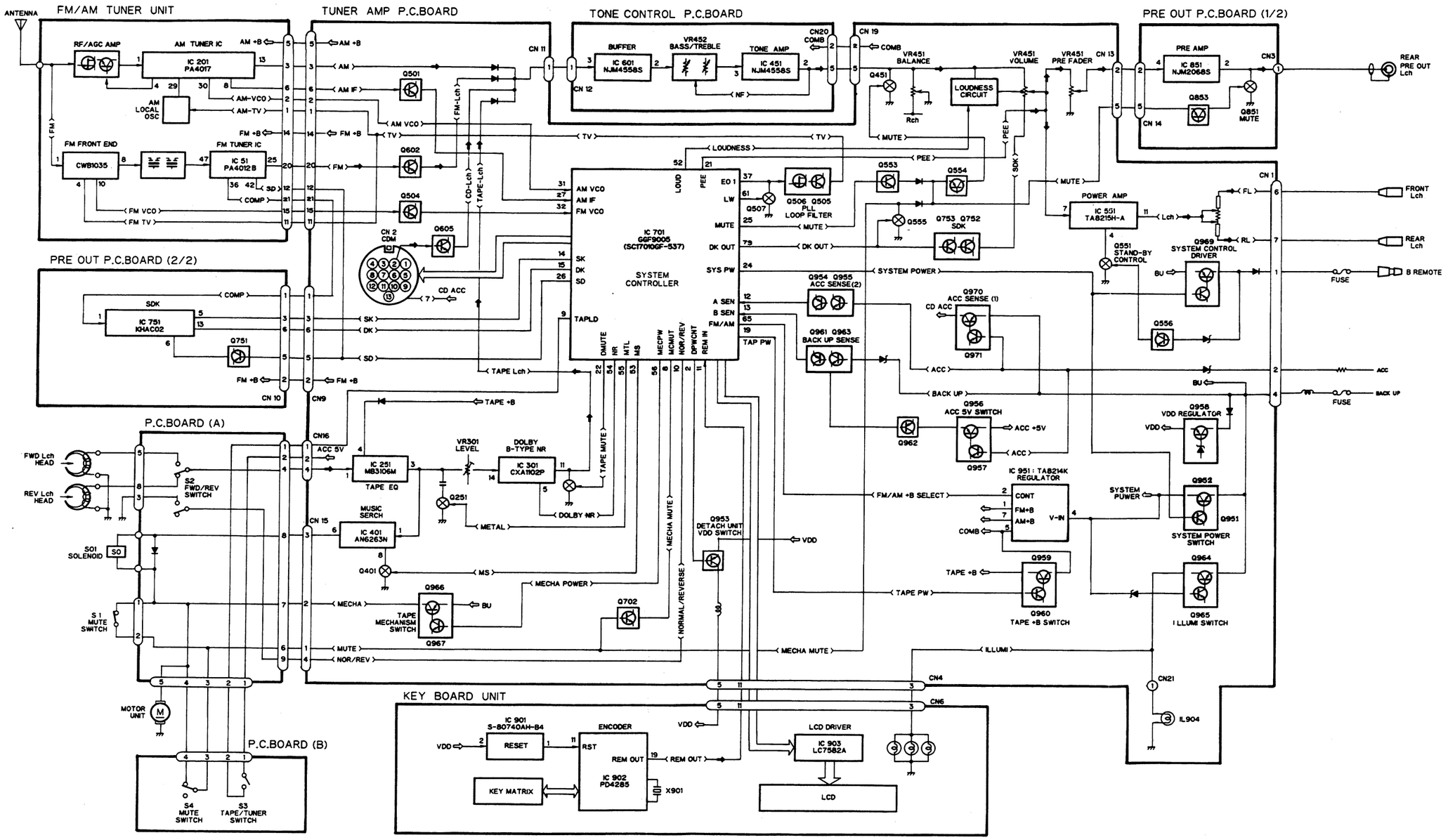


Fig. 12

11. ADJUSTMENT

● Test Mode

Test mode is mainly used in adjustment of CD multi-players.

●Switching to test mode

1.Turn off the Back-up and ACC off.

2.Discharge VDD.

3.Turn the Back-up and ACC on while pressing the 4&6 keys together.

●Canceling test mode

While pressing the CD multi-player clear button, switch this unit back-up and ACC OFF.

●Key functions during test mode

The CD multi-player, deck, and tuner are selected by the SOURCE button.

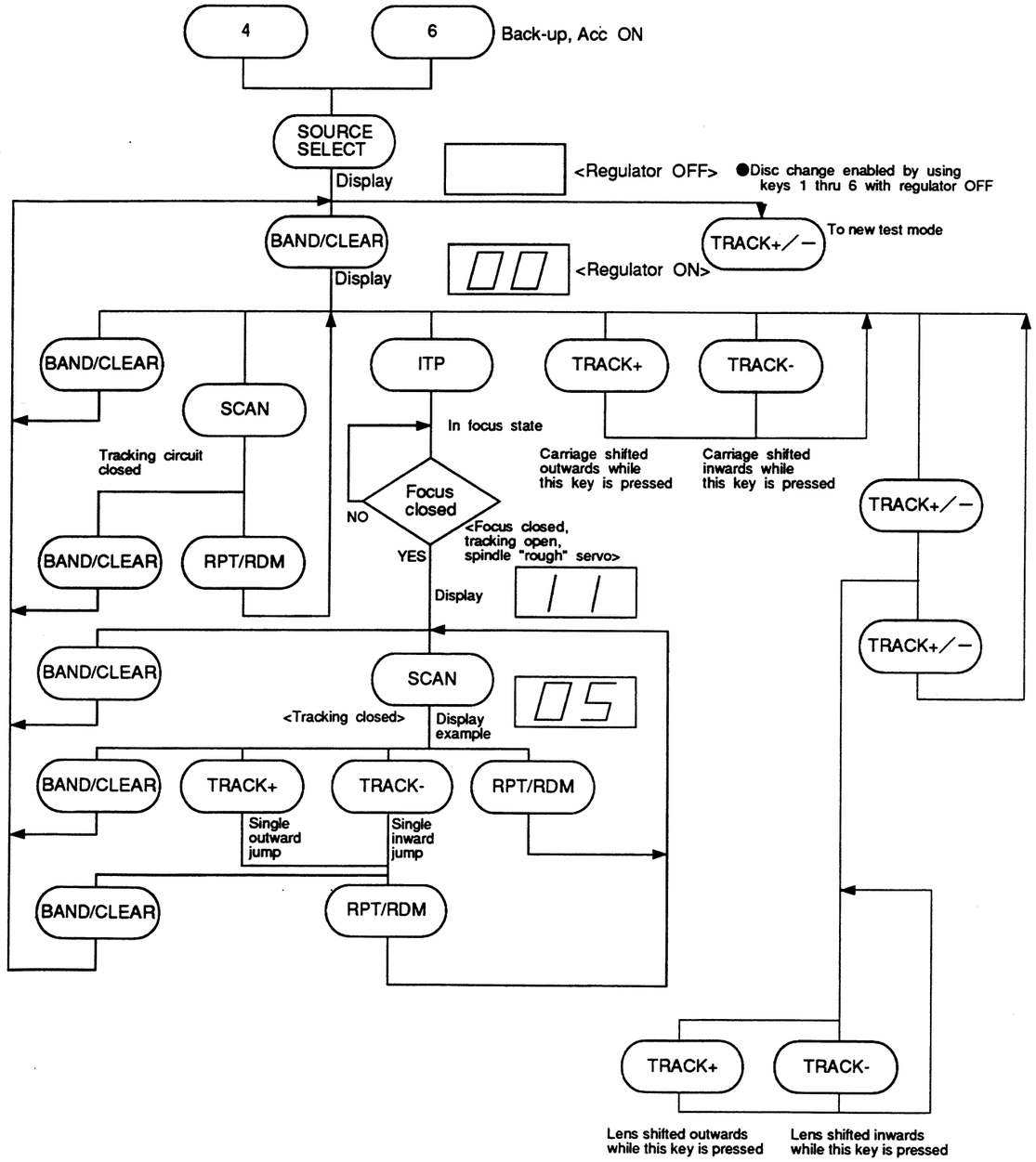
a)CD multi-player

key	Function
BAND / CLEAR	Regulator ON / OFF
TRACK +	FWD kick
TRACK -	REV kick
SCAN	Tracking close
RPT / RDM	Tracking open
ITP	Focus close
TRACK +/-	Carriage/tracking switching

b)Deck and tuner

No corresponding function. Normal operation executed.

● Flow Chart



• Connection Diagram

NOTICE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of SSG.

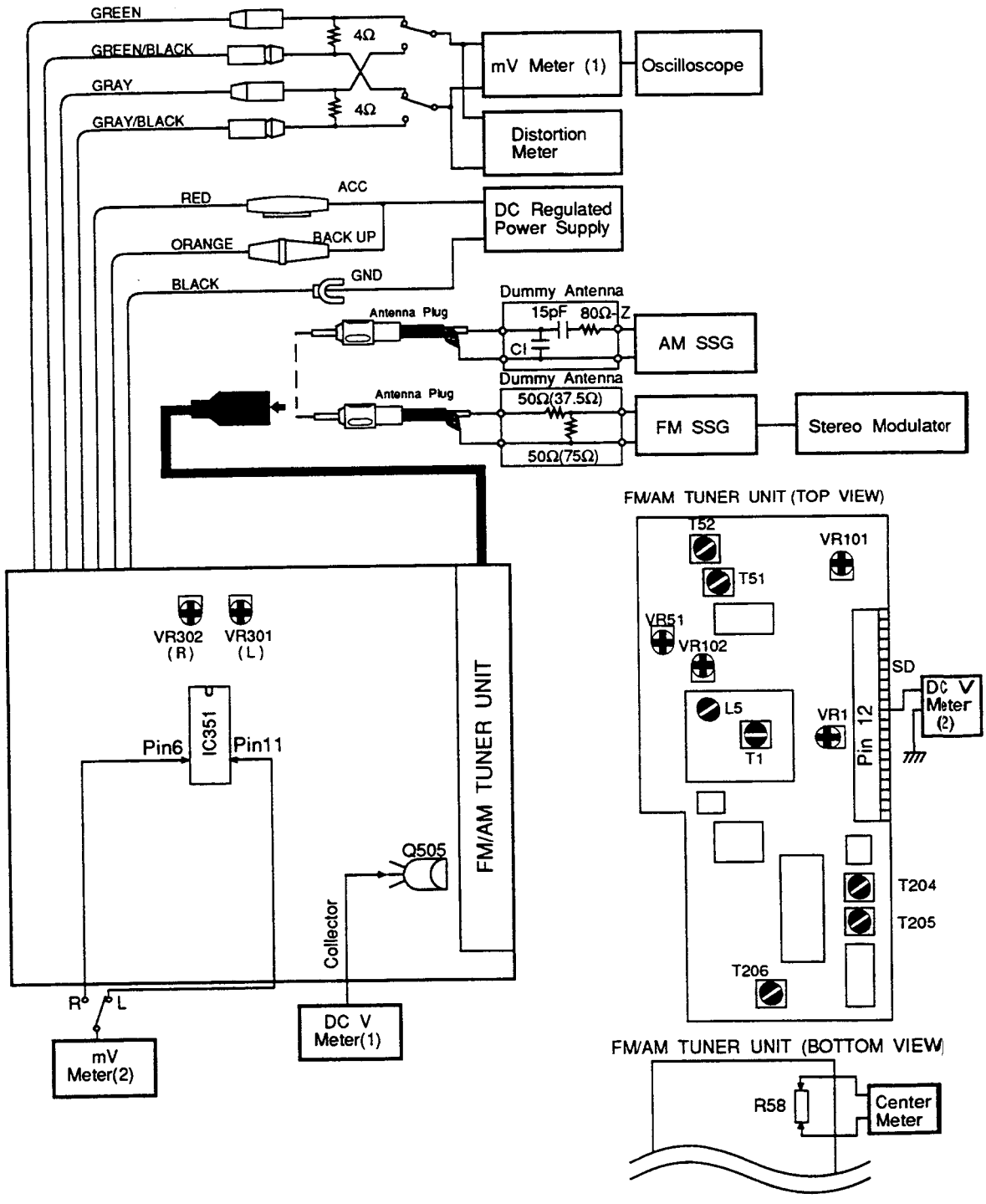


Fig. 13

DOLBY NR ADJUSTMENT
(KEH-M4500SDK/WG,KEH-M4500/EW,IT)

No	Cassette Tape	Adjusting Point	Adjustment Method (Switch Position)
1	NCT-150(400Hz,200nwb/m)	VR301(Lch)VR302(Rch)	mV Meter(2):-6dBs ± 1dB (DOLBY NR Switch:OFF)

FM ADJUSTMENT ※ Stereo MOD.: 1kHz,L+R=90%, Pilot=10%

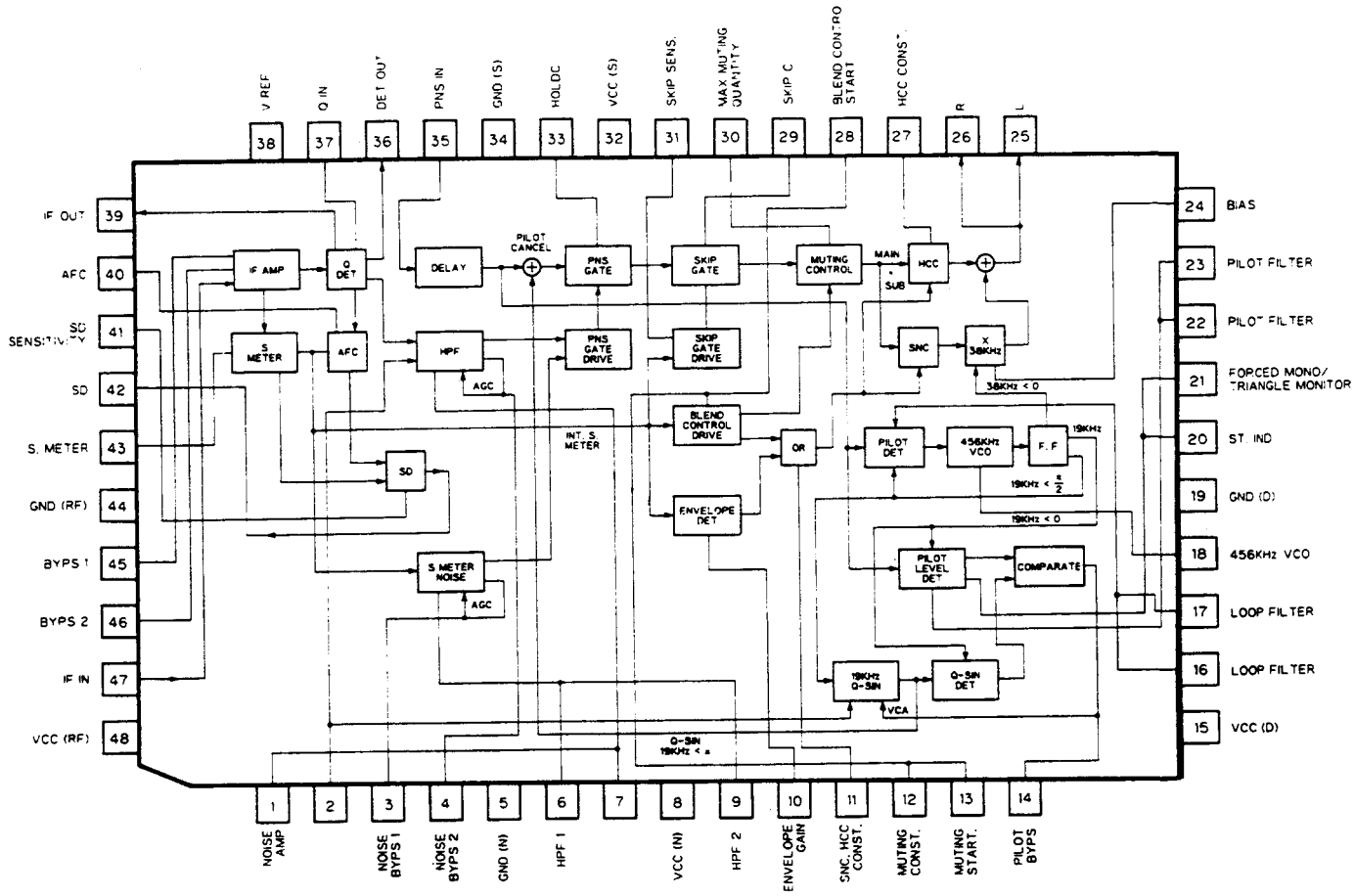
	No	FM SSG(400Hz,100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dB μ V)			
IF	1	98.1	60	98.1	T51	Center Meter:0
	2	98.1	60	98.1	T52	Distortion Meter:Minimum
	3	Repeat No.1-2 alternately so that the center meter indicates the 0 output and distortion meter indicates minimum output.				
Front End	1			108	L5	DC V Meter (1):6.2±0.2V
	2			87.5		Verify that DC V Meter(1) is 2.1±0.6V
	3	98.1	8	98.1	T1	Oscilloscope:Optimum Symmetry
	4	98.1※	60	98.1	T1	Distortion Meter:Minimum Rotate T1 less than±90
Soft Mute	1	98.1	60	98.1		mV Meter(1):A dB
	2	98.1	9	98.1	VR102	mV Meter(1):A-3dB
ARC	1	98.1※	34	98.1	VR101	mV Meter(1):Separation 5dB
SD	1	98.1	15	98.1	VR51	DC V Meter(2):Approx. 5V
	2	98.1	14	98.1		Verify that DC V Meter (2) is approx. 0V.
	3	98.1	55	98.1	VR1	DC V Meter(2):Approx. 5V
		Connect collector of Q2 to GND. Connect DC regulated power supply to pin 3 of FM Front End through resistor(330Ω). Add 4.3v from DC regulated power supply.				
	4	98.1	54	98.1		Verify that DC V Meter (2) is approx. 0V.

MW/LW ADJUSTMENT

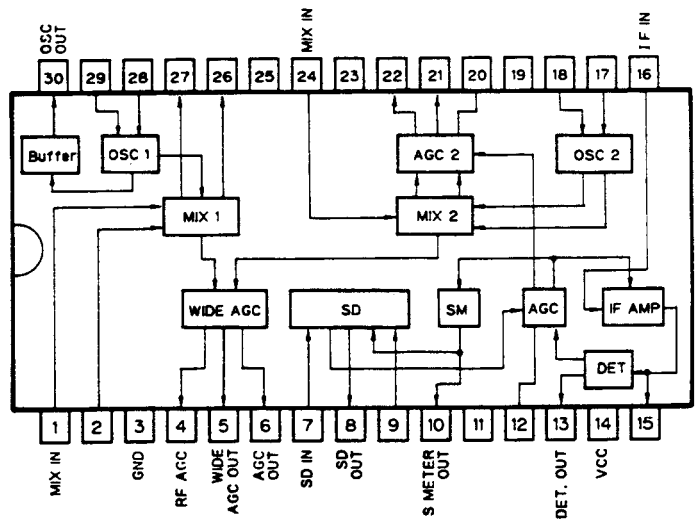
	No	AM SSG(400Hz,30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(kHz)	Level(dB μ V)			
Tuning Volt	1	(MW MODE)		1,602	———	Verify that DC V Meter (1) is less than 6.5V.
	2	(LW MODE)		153	———	Verify that DC V Meter (1) is more than 2.0V.
IF	1	999	20-25	999	T204,205, 206	mV Meter(1):Maximum

• ICs

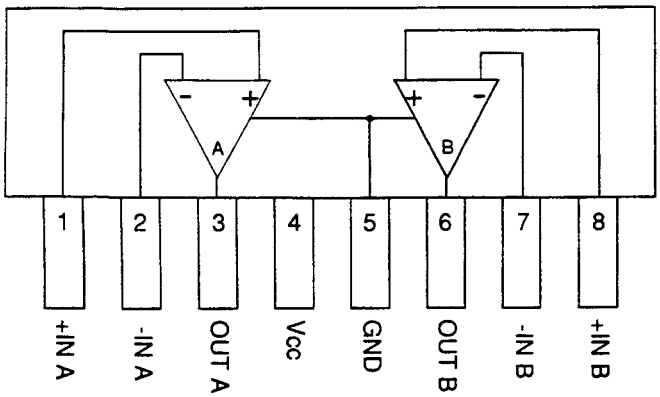
PA4012B



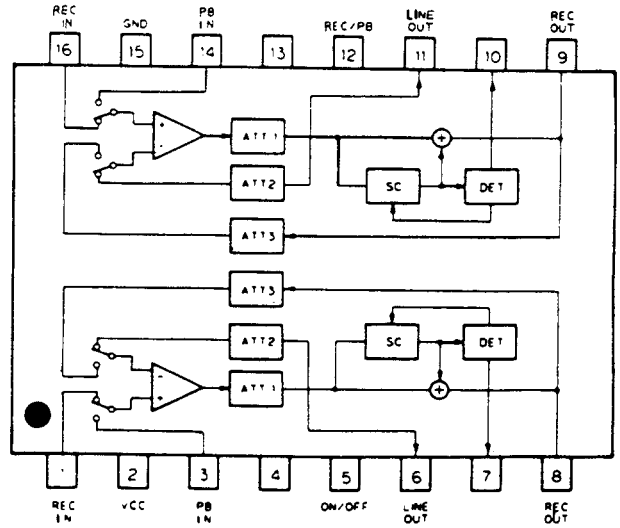
PA4017



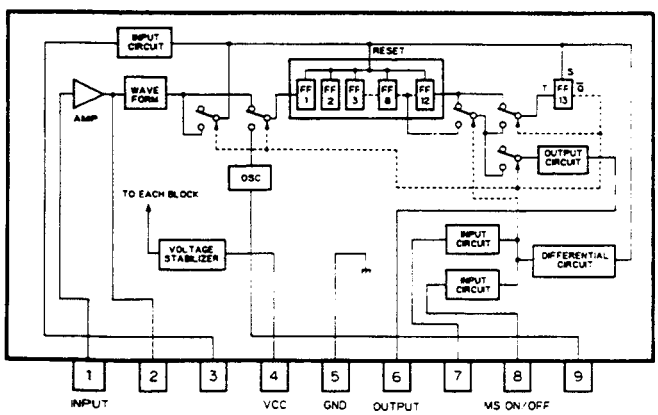
MB3106M



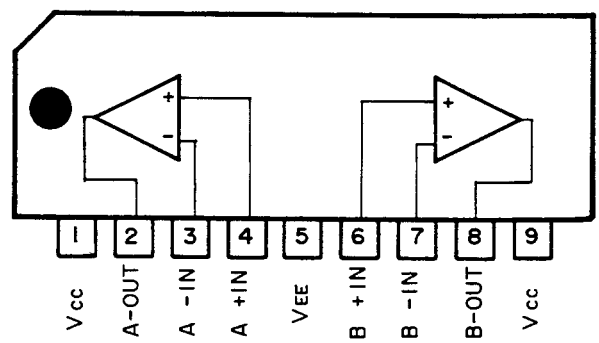
CXA1102P



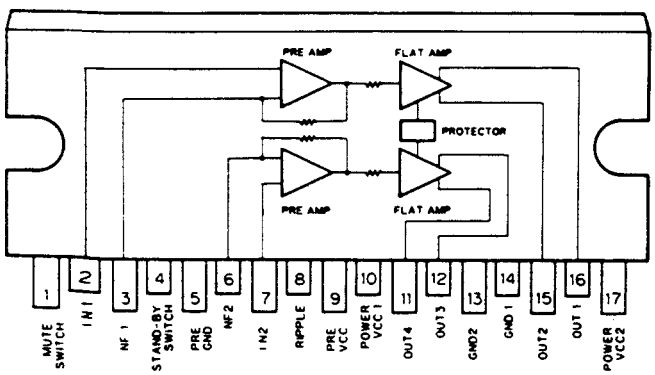
AN6263N



NJM4558S

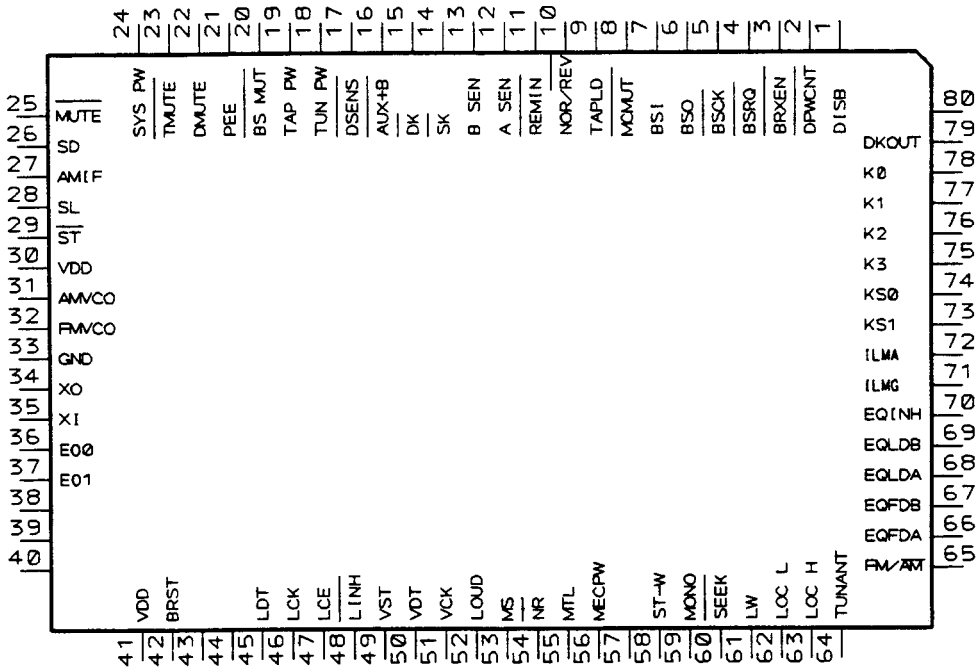


TA8215H-A



*GGF9005 (SC17010GF-537)

*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.



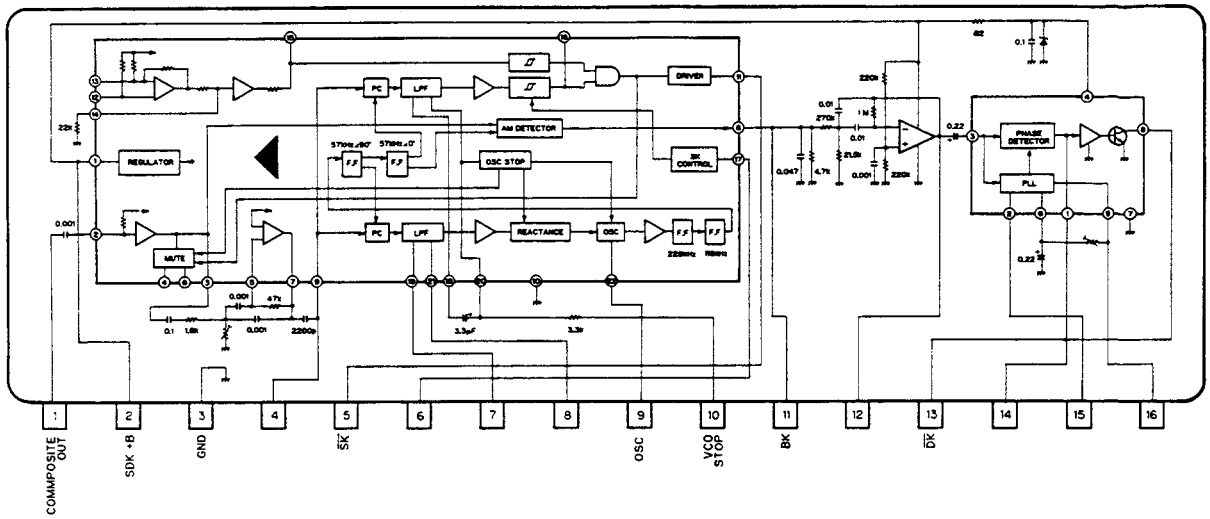
• Pin Functions (GGF9005)

Pin	Pin name	I/O	Output Format	Function
1	DISB	output	C	
2	$\overline{\text{DPWCNT}}$	output	C	EJECT/REPLACE control output ("L":REPLACE)
3	$\overline{\text{BRXEN}}$	input/ output	N	Reception enable
4	$\overline{\text{BSRQ}}$	input/ output	N	Polling request
5	$\overline{\text{BSCK}}$	input/ output	C	Serial clock input / output
6	BSO	output	C	Serial data output
7	BSI	input	C	Serial data input
8	$\overline{\text{MCMUT}}$	input	C	Mechanism mute request
9	TAPLD	input	C	Tape loading input
10	$\overline{\text{NOR/REV}}$	input	C	Tape direction
11	$\overline{\text{REMIN}}$	INT1	C	Key input (Down Edge:interruption)
12	A SEN	INT0	C	Acc sense input
13	B SEN	CE	C	Back up sense input
14	$\overline{\text{SK}}$	input	C	SK signal input
15	$\overline{\text{DK}}$	input	C	DK signal input
16	$\overline{\text{AUX+B}}$	input	C	AUX+B input
17	$\overline{\text{DSENS}}$	input	C	Detach sense input
18	TUN PW	output	N	Not used
19	TAP PW	output	N	Deck power
20	$\overline{\text{BS MUT}}$	output	N	Bus mute output
21	PEE	output	C	PEE sound oscillating output
22	DMUTE	output	C	Deck mute output
23	$\overline{\text{TMUTE}}$	output	C	Not used
24	SYS PW	output	C	System power output
25	$\overline{\text{MUTE}}$	output	C	Mute
26	SD	input	C	FM IF IN
27	AMIF	input	C	AM IF IN
28	SL	input	C	Signal level input
29	$\overline{\text{ST}}$	input	C	Stereo input
30	VDD			

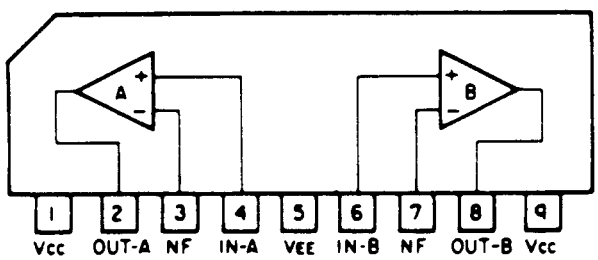
Pin	Pin name	I/O	Output Format	Function
31	AMVCO	input		AM VCO input
32	FMVCO	input		FM VCO input
33	GND			
34	XO	output	C	
35	XI	input	C	
36	EOO	output	C(3)	Not used
37	EO1	output	C(3)	
38 39 40	NC			Not used
41	VDD			
42	BRST	output	C	Terminal reset
43 44	NC			Not used
45	LDT	output	C	LCD driver data
46	LCK	output	C	LCD driver clock
47	LCE	output	C	LCD driver CE
48	$\overline{\text{LINH}}$	output	C	LCD driver INH
49	VST	output	C	Not used
50	VDT	output	C	Not used
51	VCK	output	C	Not used
52	LOUD	output	C	Loudness
53	MS	output	C	Music search output
54	$\overline{\text{NR}}$	output	C	DOLBY B NR output ("L":ON)
55	MTL	output	C	METAL output
56	MECPW	output	C	Deck mechanism regulator control output
57	NC			Not used
58	ST-W	output	C	Not used
59	MONO	output	C	Forced mono output
60	$\overline{\text{SEEK}}$	output	C	SEEK output pin Outputs low signal during SEEK operation.
61	LW	output	C	LW output
62	LOC L	output	C	Local L setup
63	LOC H	output	C	Local H setup
64	TUNANT	output	C	Not used
65	FM/$\overline{\text{AM}}$	output	C	FM/AM select
66	EQFDA	output	C	Not used
67	EQFDB	output	C	Not used
68	EQLDA	output	C	Not used
69	EQLDB	output	C	Not used
70	EQINH	output	C	Not used
71	ILMG	output	C	Not used
72	ILMA	output	C	Not used
73	KS1	output	C	Model sense output
74	KSO	output	C	Destination selection output
75	K3	input	C	Key matrix data input
76	K2	input	C	Key matrix data input
77	K1	input	C	Key matrix data input
78	KO	input	C	Key matrix data input
79	DKOUT	output	C	SDK interruption output
80	NC			Not used

Output Format	Meaning
C	C-MOS
N	N channel open drain

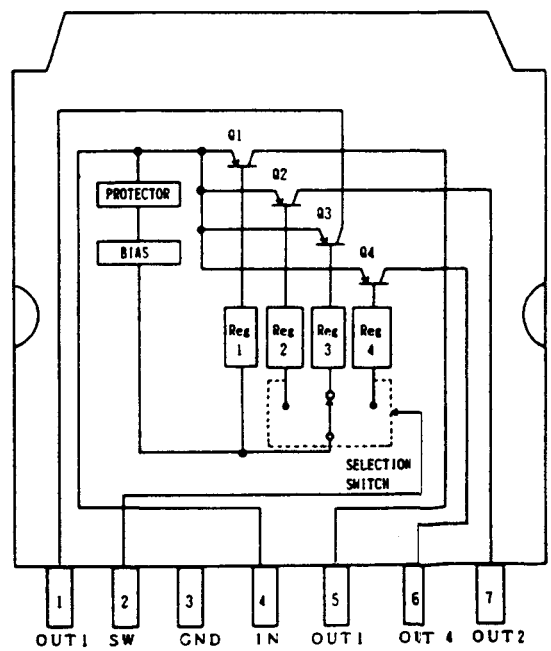
KHAC02



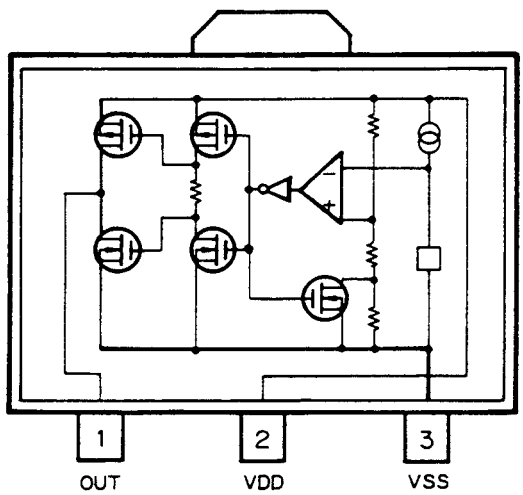
NJM2068S



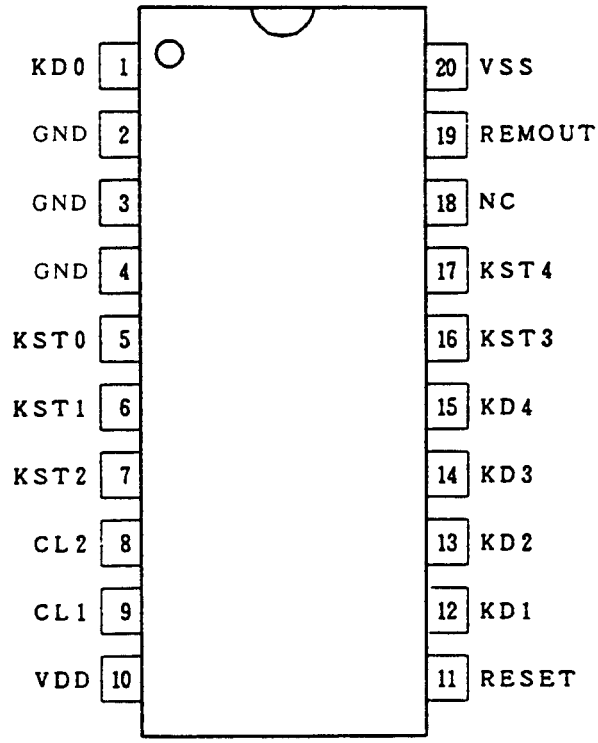
TA8214K



S-80740AH-B4



PD4285

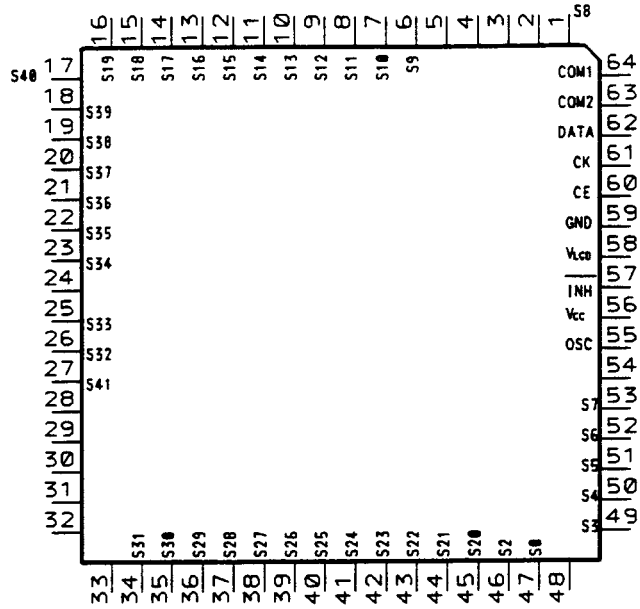


● **Pin Functions (PD4285)**

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	KDD	INPUT		Key return input
2—4	GND			GND
5—7	KST0—KST2	OUTPUT	NM	Key strobe output
8	CL2			System clock generator connector pin
9	CL1			System clock generator connector pin
10	VDD			
11	RESET	INPUT		Reset input
12—15	KD1—KD4	INPUT		Key return input
16, 17	KST3, KST4	OUTPUT	NM	Key strobe output
18	NC			
19	REMOUT	OUTPUT	NM	Remote controller data output
20	VSS			GND

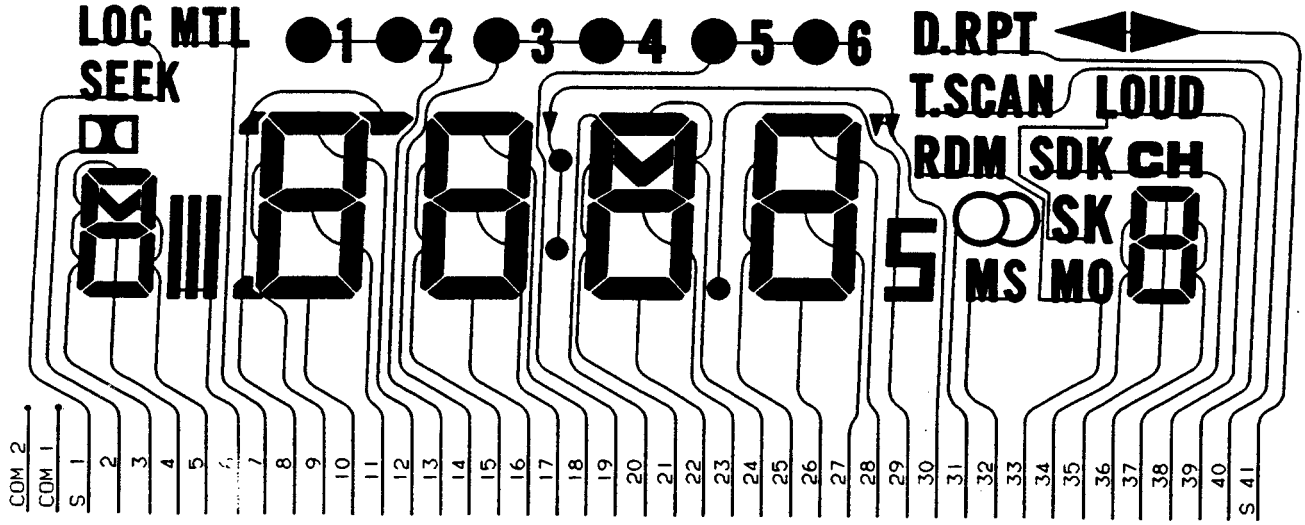
Output Format	Meaning
NM	Middle resistivity N channel open drain

*LC7582A


S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S40
S39
S38
S37
S36
S35
S34
S33
S32
S41
COM1
COM2
DATA
CK
CE
GND
VLCD
INH
VCC
OSC
S7
S6
S5
S4
S3
S2
S1
S20
S21
S22
S23
S24
S25
S26
S27
S28
S29
S30
S31

● **LCD (CAW1168)**

SEGMENT



COMMON

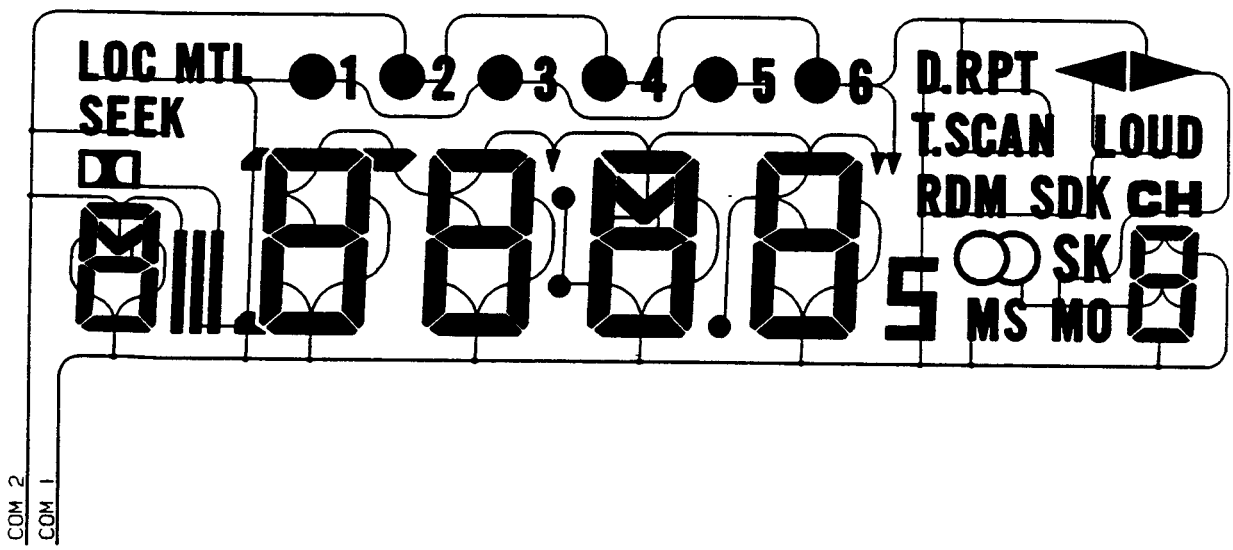


Fig. 14

● FM FRONT END (CWB1035)

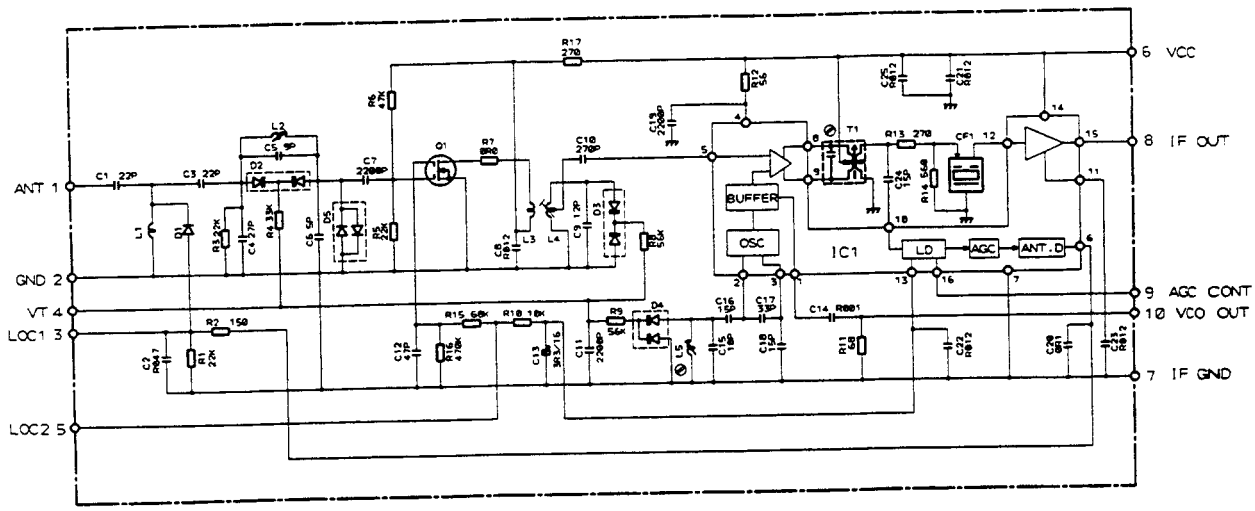
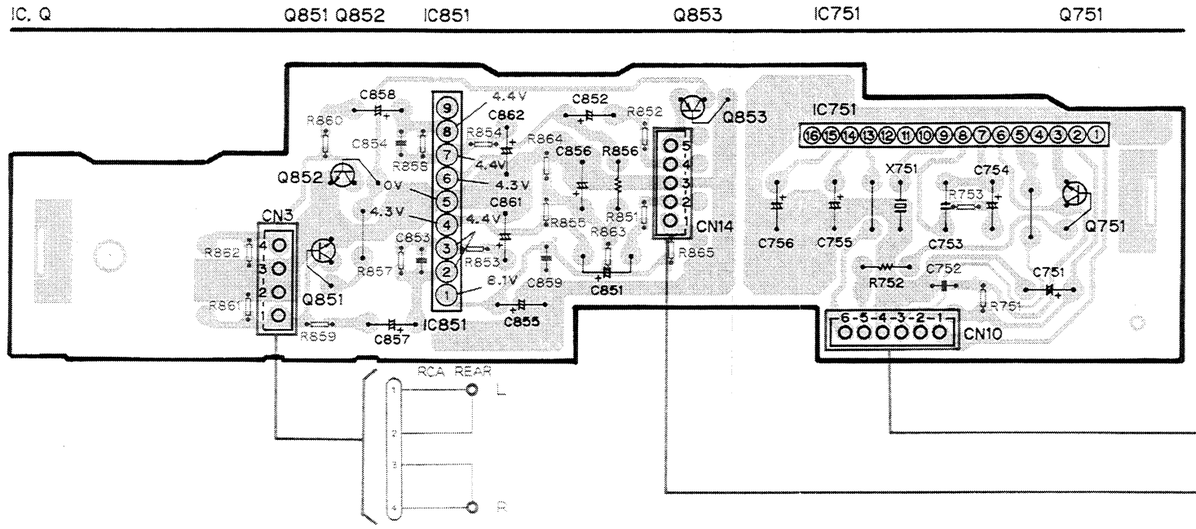


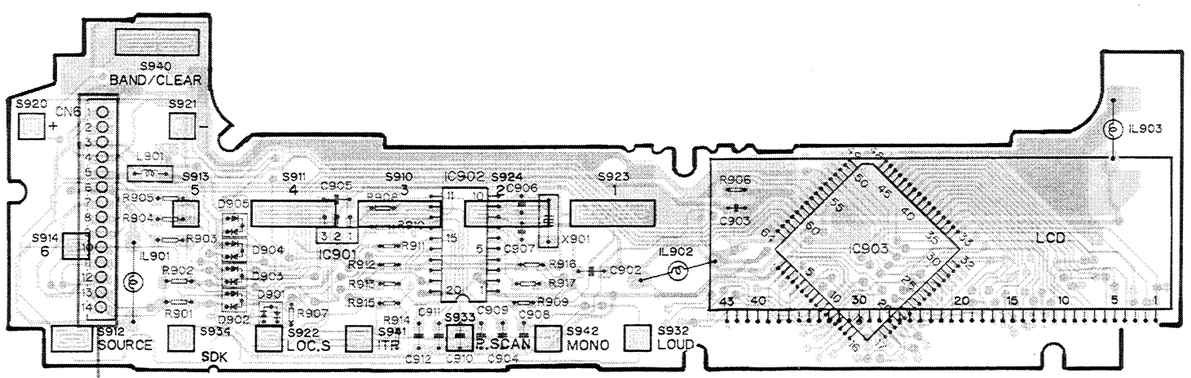
Fig. 15

12. CONNECTION DIAGRAM (KEH-M4500SDK/WG)

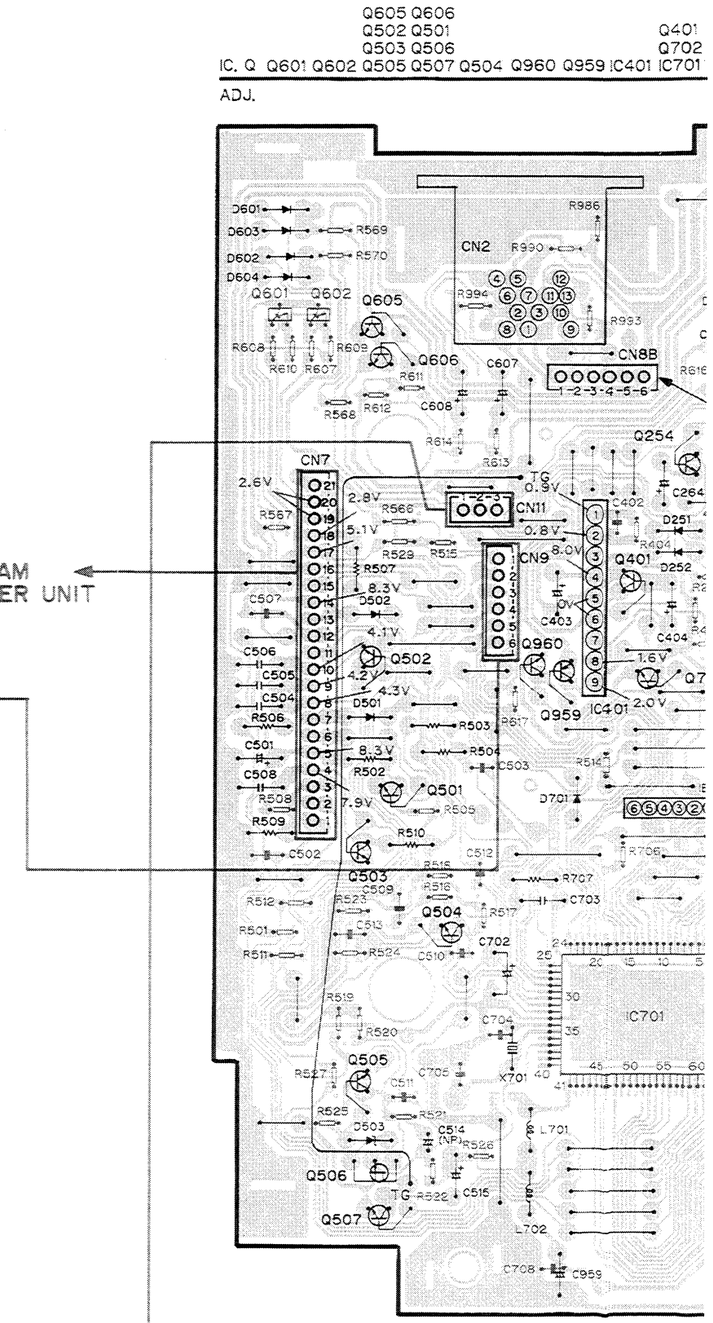
PRE OUT P.C. BOARD



KEY BOARD UNIT

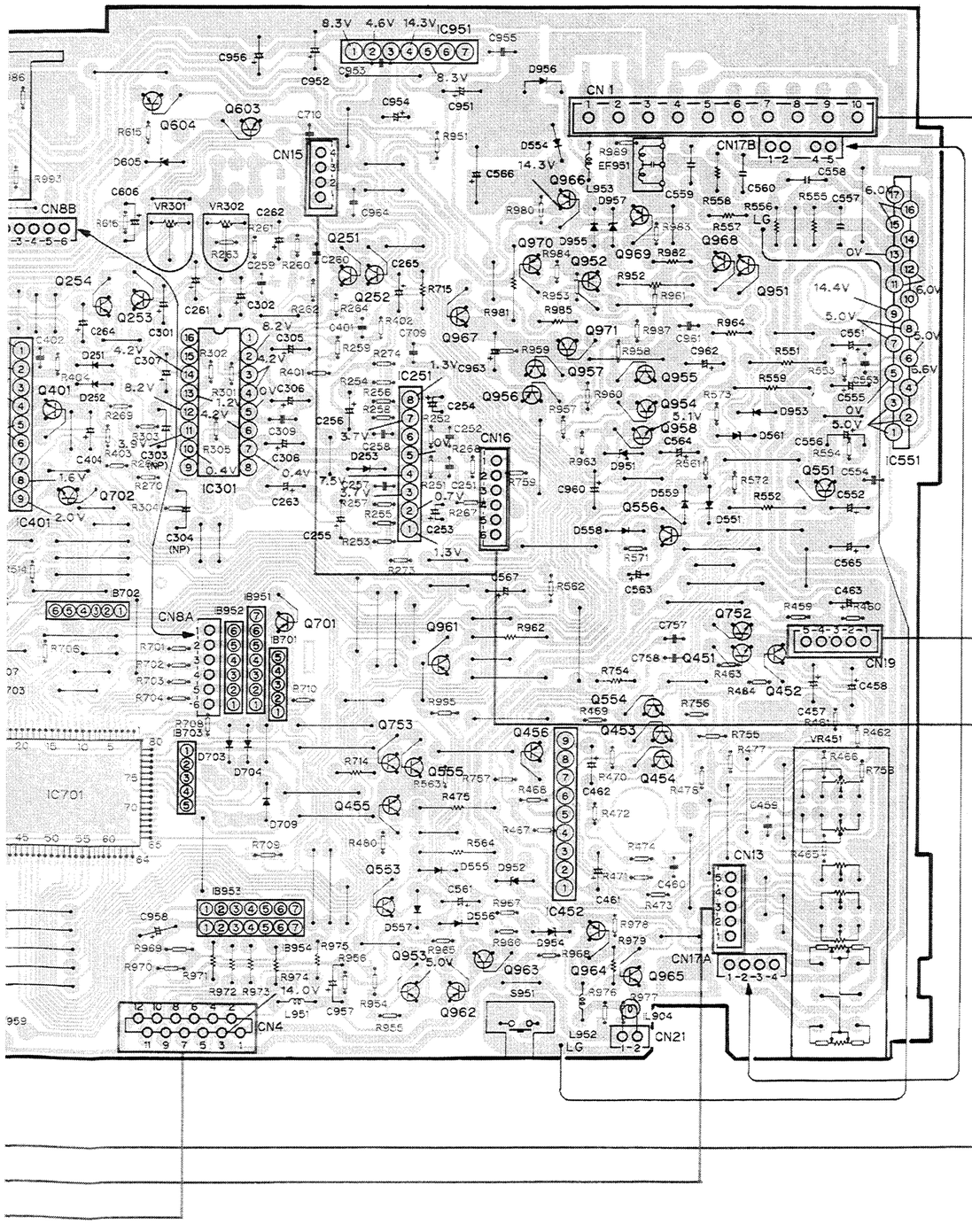


TUNER AMP P.C. BOARD



Q401 Q604 Q603 Q252 Q967 Q970 Q556 Q969 Q554
Q702 Q254 Q253 IC301 Q701 Q753 IC251 IC951 Q957 Q952 Q955 Q453 Q968
59 IC401 IC701 Q455 Q555 Q961 Q956 Q966 Q971 Q954 Q454 Q752 Q951
Q251 Q553 Q953 Q962 Q963 Q456 IC452 Q964 Q958 Q965 Q451 Q452 Q551 IC551

VR301 VR302



TO
CASSETTE MECHANISM
ASSY

TONE CONTROL P.C. BOARD

IC IC451 IC601

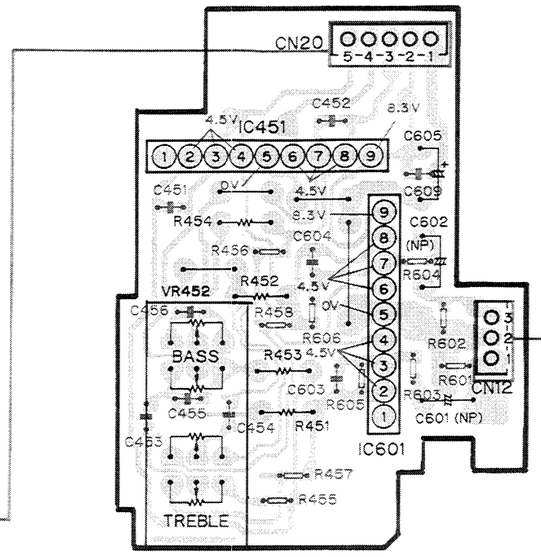
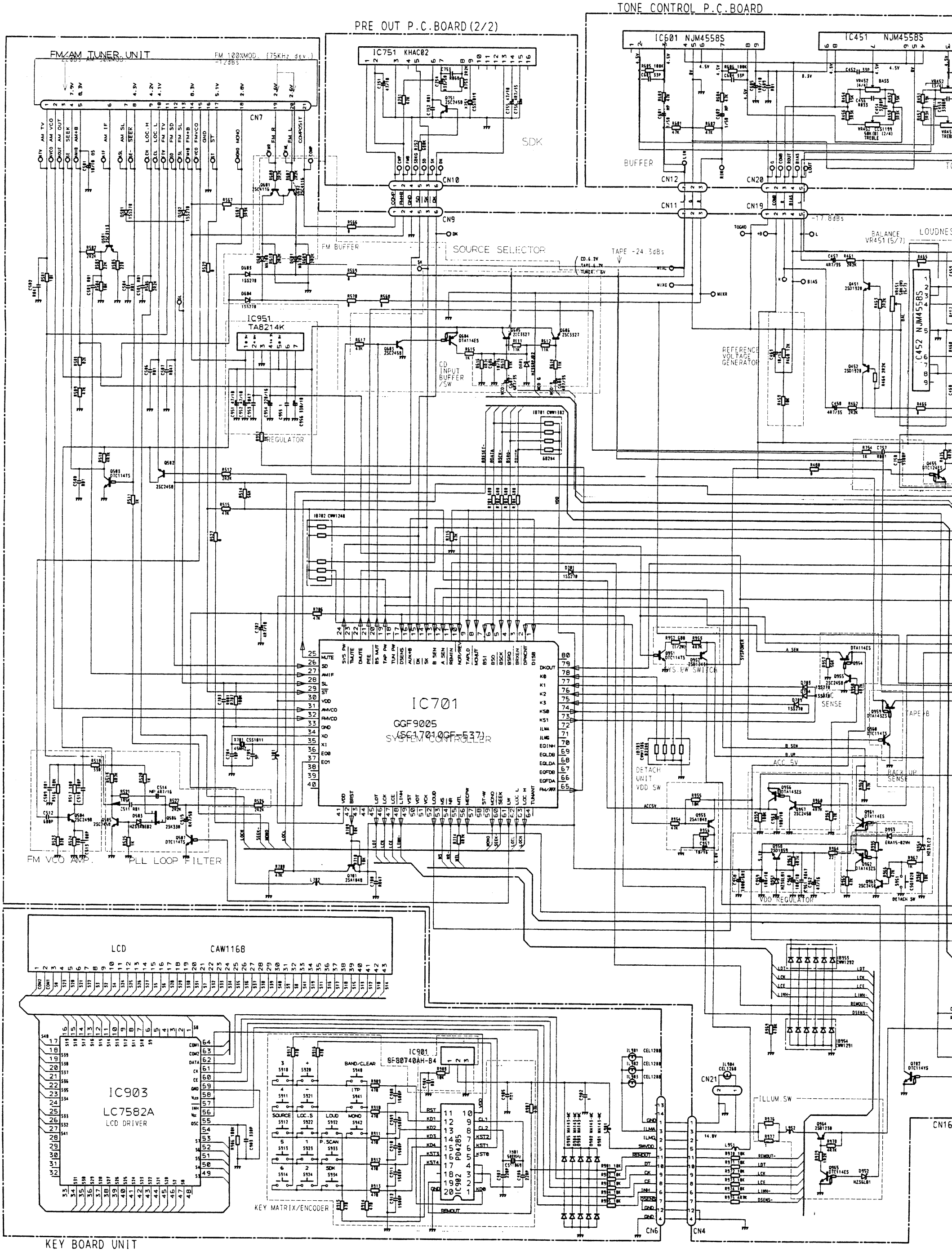


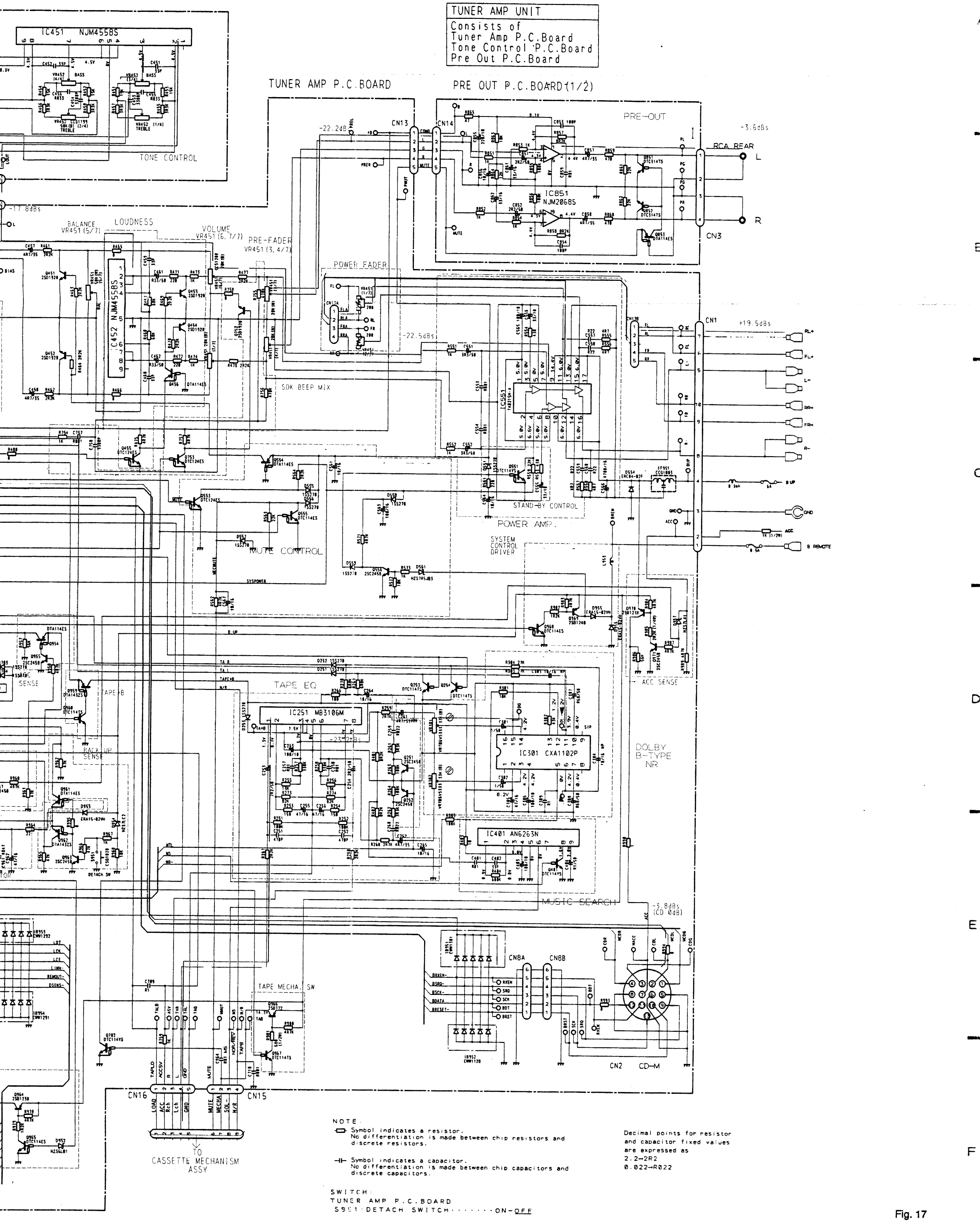
Fig. 16

13. SCHEMATIC CIRCUIT DIAGRAM (KEH-M4500SDK/WG)



TUNER AMP UNIT

Consists of
Tuner Amp P.C.Board
Tone Control P.C.Board
Pre Out P.C.Board



NOTE:

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

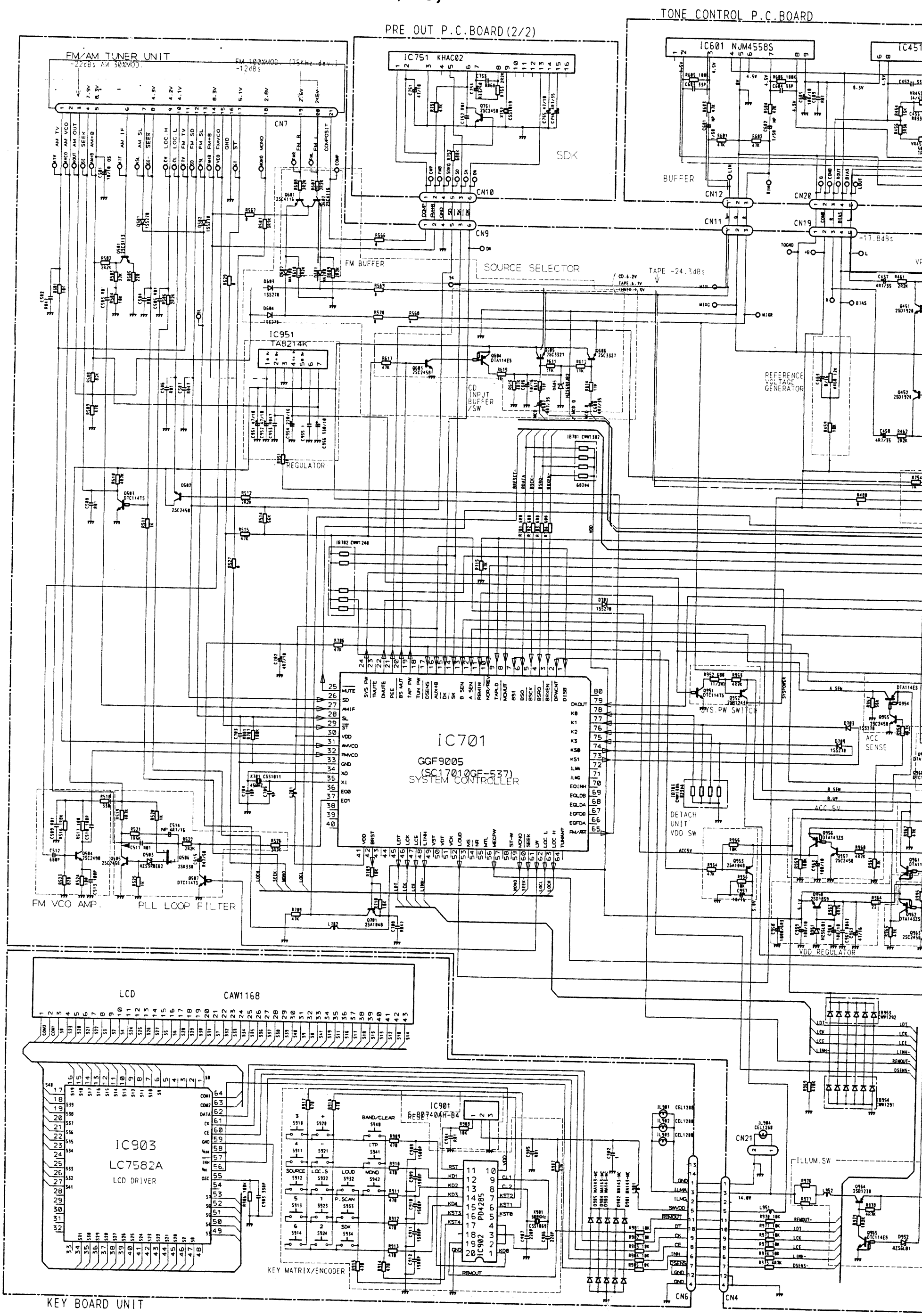
Decimal points for resistor and capacitor fixed values are expressed as
2.2→2R2
0.022→R022

SWITCH:
TUNER AMP P.C.BOARD
S951: DETACH SWITCH ..... ON-OFF

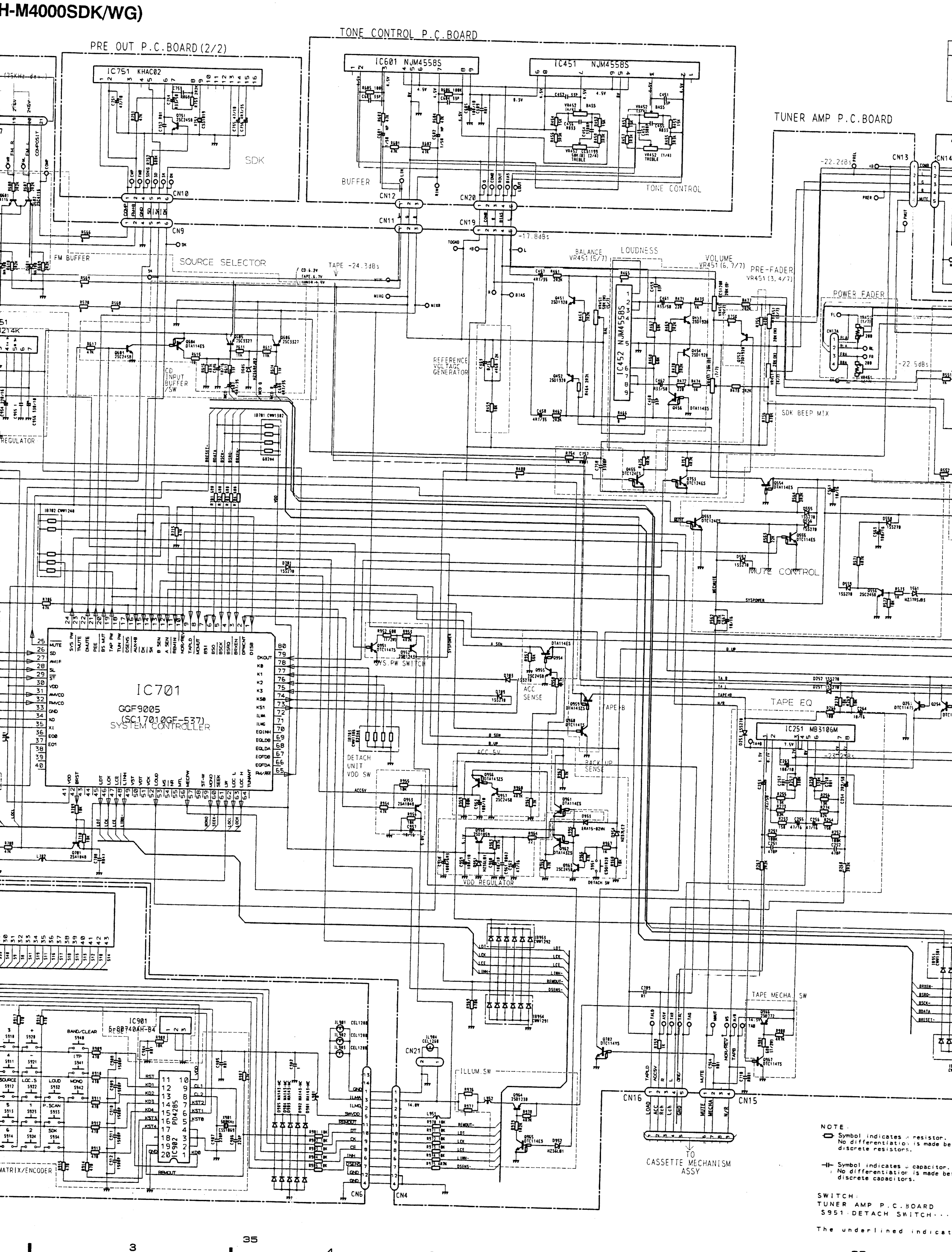
The underlined indicates switch position.

Fig. 17

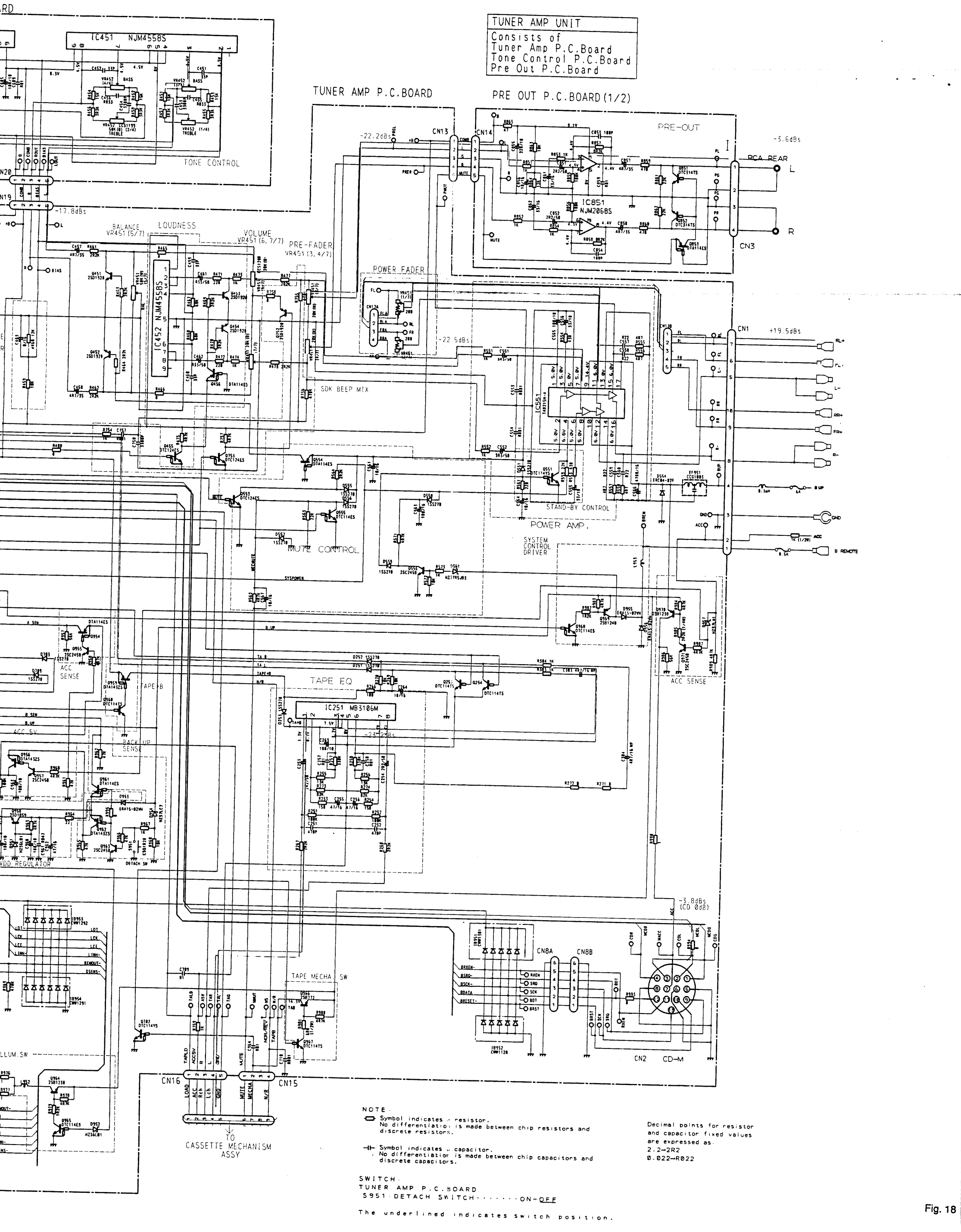
14. SCHEMATIC CIRCUIT DIAGRAM (KEH-M4000SDK/WG)



H-M4000SDK/WG)



TUNER AMP UNIT
Consists of Tuner Amp P.C.Board Tone Control P.C.Board Pre Out P.C.Board



NOTE:

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as.
2.2→2R2
0.022→R022

SWITCH:
TUNER AMP P.C.BOARD
S951 DETACH SWITCH.....ON-OFF

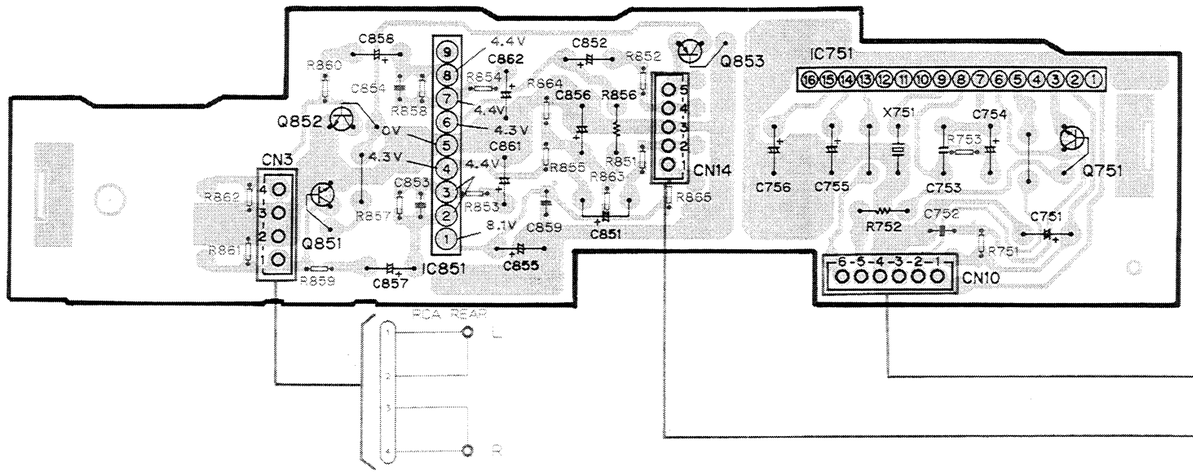
The underlined indicates switch position.

Fig. 18

15. CONNECTION DIAGRAM (KEH-M4000SDK/WG)

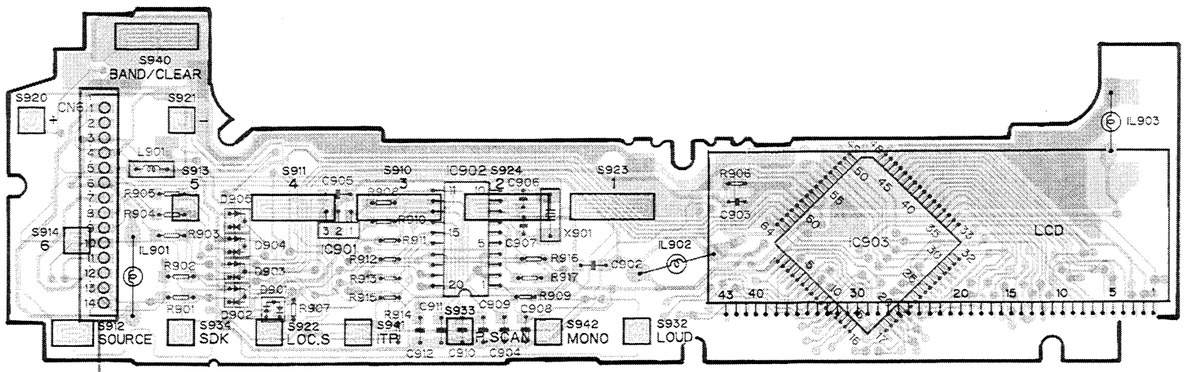
PRE OUT P.C. BOARD

IC. Q Q851 Q852 IC851 Q853 IC751 Q751



KEY BOARD UNIT

IC IC901 IC902 IC903

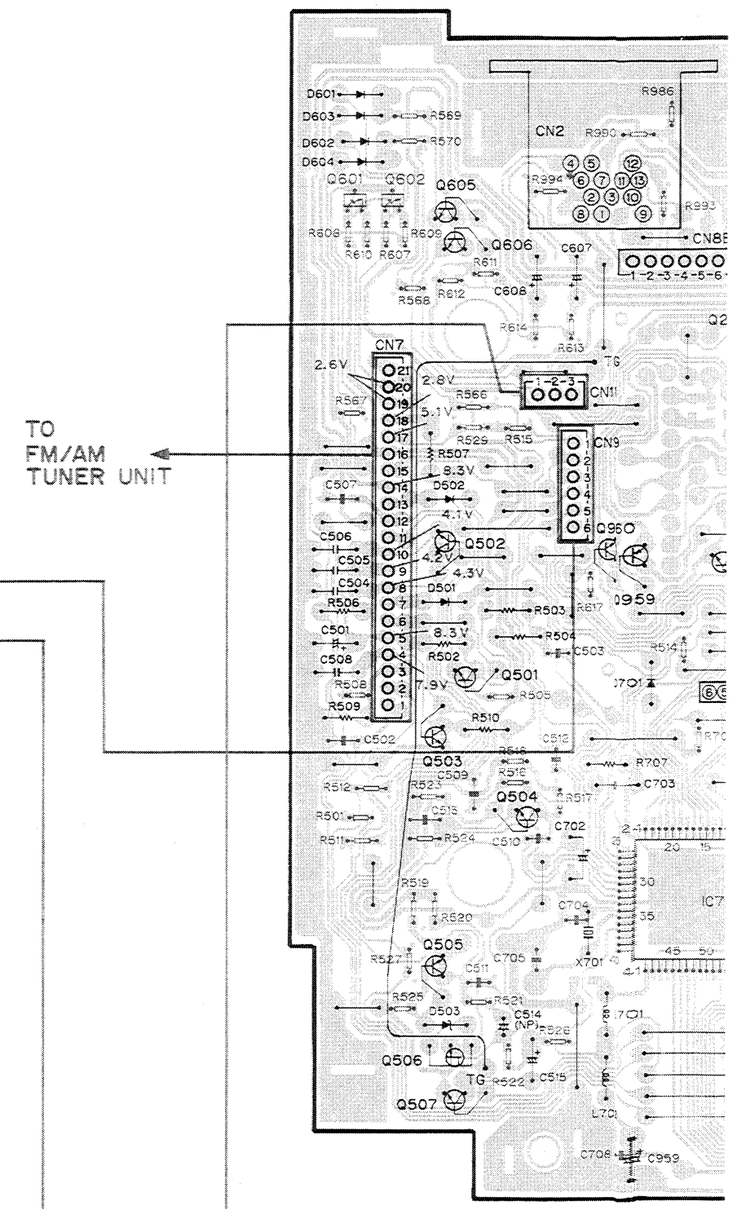


TUNER AMP P.C. BOARD

Q605 Q606
Q502 Q501
Q503 Q506
IC. Q Q601 Q602 Q505 Q507 Q504 Q960 Q959

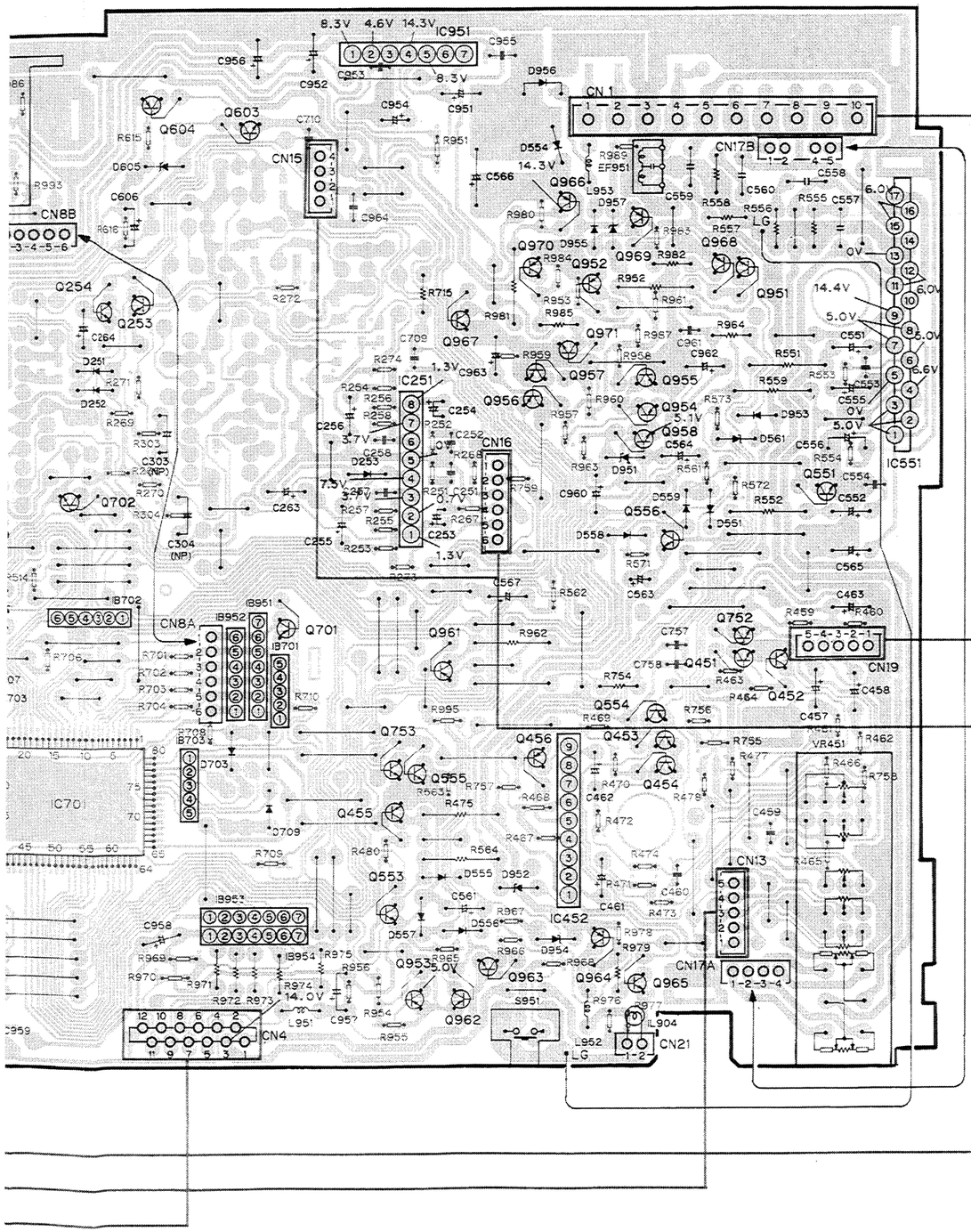
ADJ.

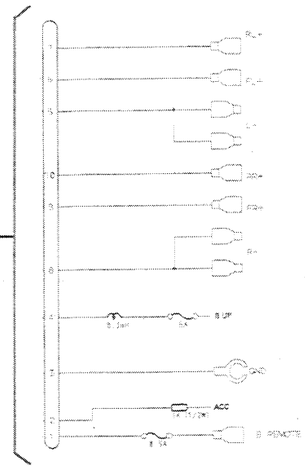
TO
FM/AM
TUNER UNIT



7 8 9 10 11

Q967 Q970 Q556 Q969 Q554
Q753 IC251 IC951 Q957 Q952 Q955 Q453 Q968
Q702 Q604 Q603 Q455 Q555 Q961 Q956 Q966 Q971 Q954 Q454 Q752 Q951
59 IC701 Q254 Q253 Q701 Q553 Q953 Q962 Q963 Q456 IC452 Q964 Q958 Q965 Q451 Q452 Q551 IC551





TO
CASSETTE MECHANISM
ASSY

TONE CONTROL P.C. BOARD

IC IC451 IC601

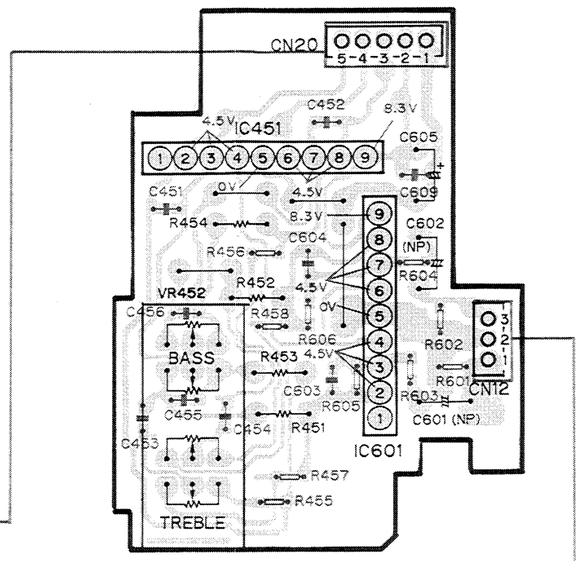


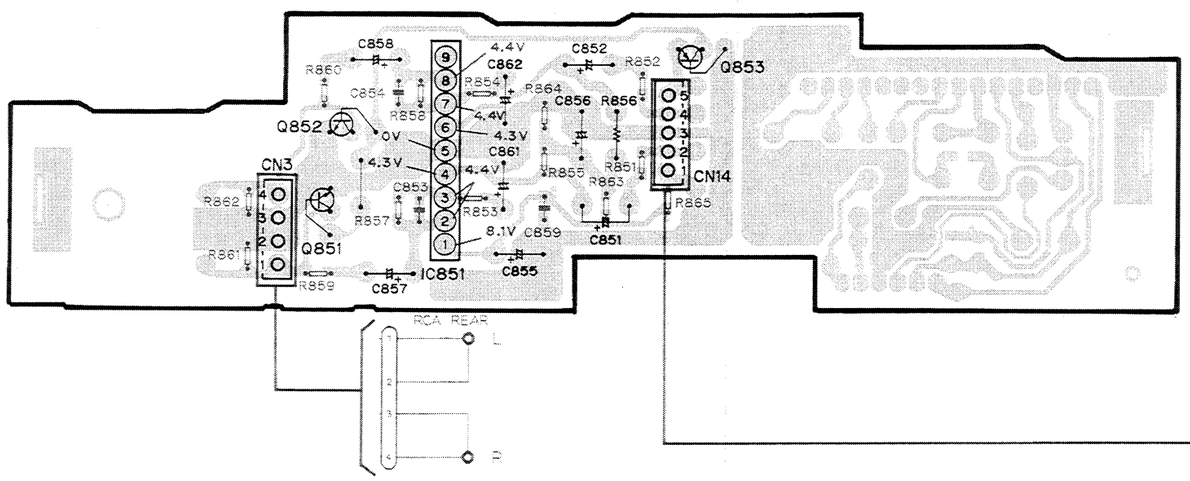
Fig. 19

38 7 8 9 39 10 11 12 40

16. CONNECTION DIAGRAM (KEH-M4500/EW, IT)

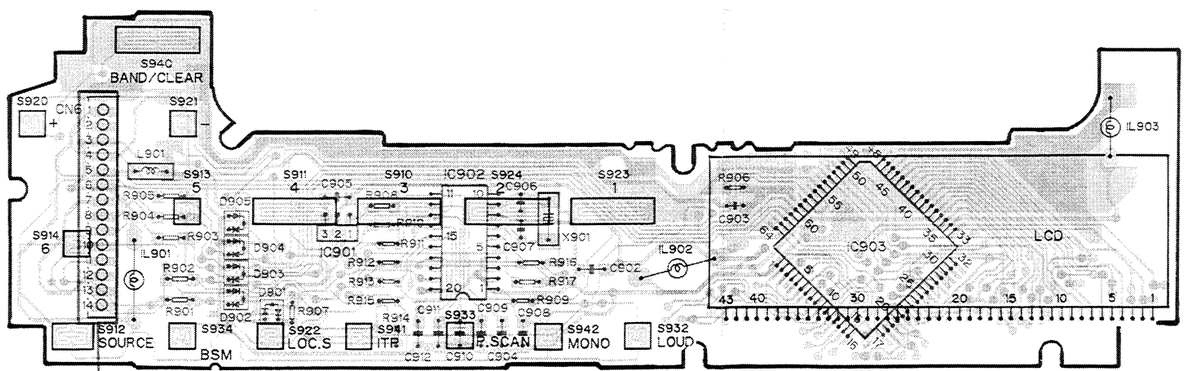
PRE OUT P.C. BOARD

IC. Q Q851 Q852 IC851 Q853



KEY BOARD UNIT

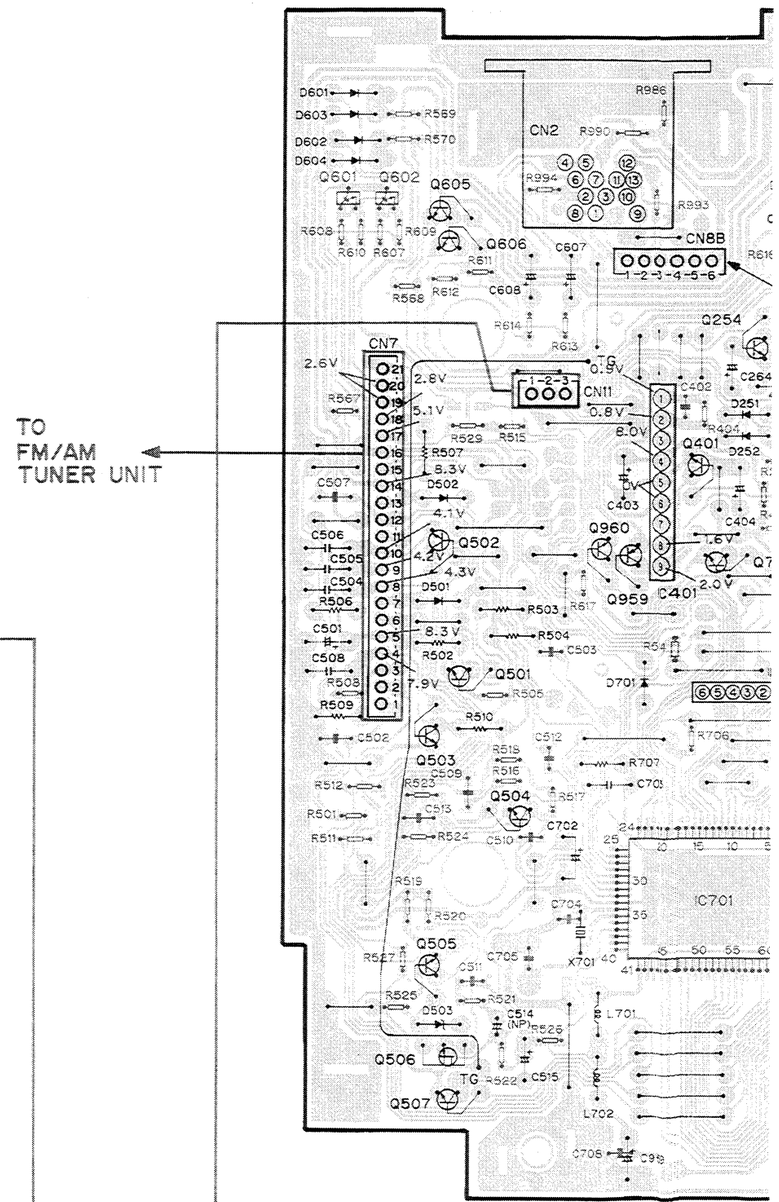
IC IC901 IC902 IC903



TUNER AMP P.C. BOARD

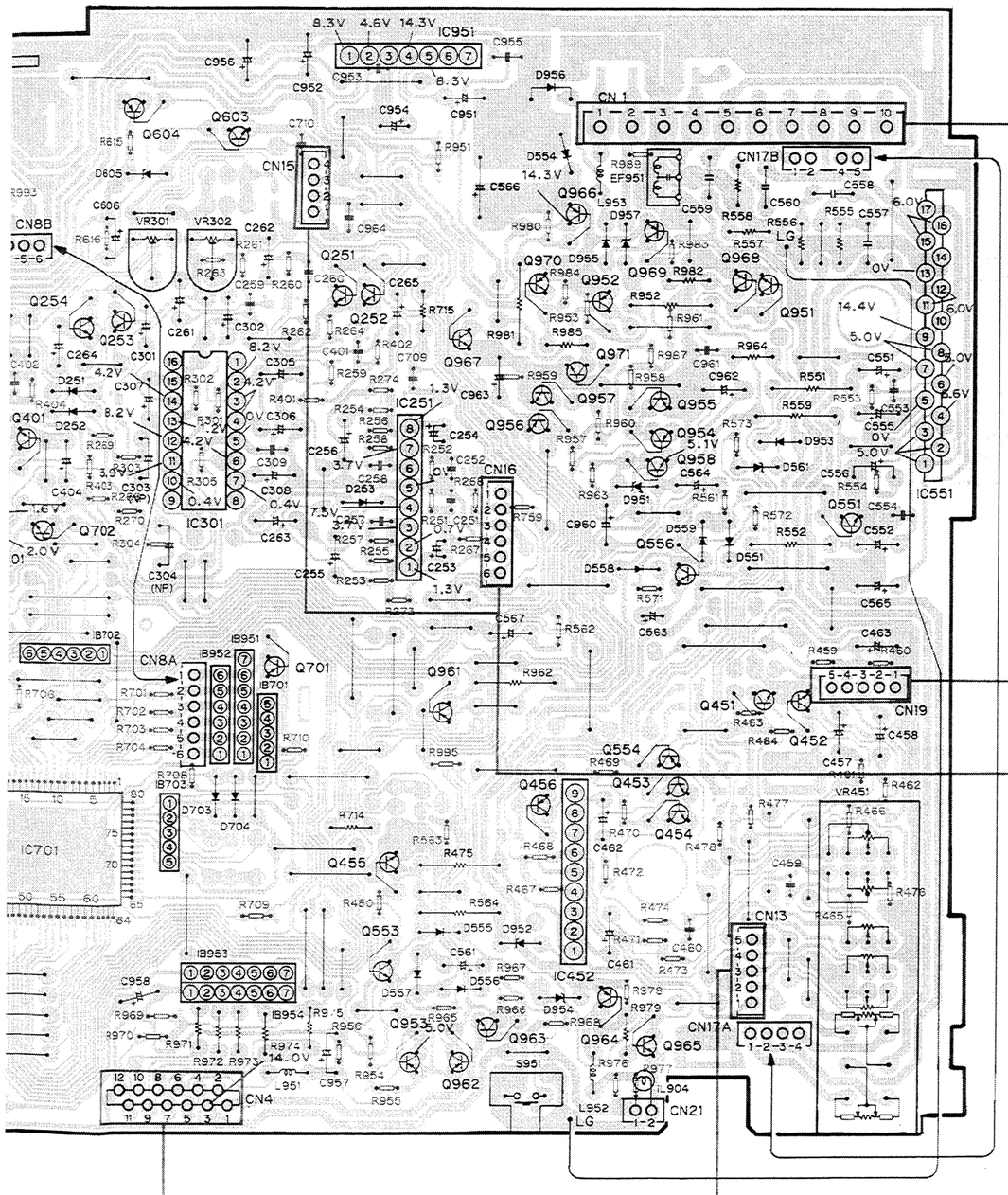
Q605 Q606
Q502 Q501 Q401
Q503 Q506 Q702
IC. Q Q601 Q602 Q505 Q507 Q504 Q960 Q959 IC401 IC701

ADJ.



Q401 Q702 C401 IC701 Q604 Q254 Q603 Q253 IC301 Q701 Q252 Q251 IC251 Q455 Q553 Q967 IC951 Q961 Q953 Q962 Q970 Q957 Q956 Q966 Q963 Q456 IC452 Q556 Q969 Q554 Q952 Q955 Q453 Q968 Q971 Q954 Q964 Q958 Q454 Q965 Q951 Q451 Q452 Q551 IC551

VR301 VR302



TONE CONTROL P.C. BOARD

IC IC451 IC601

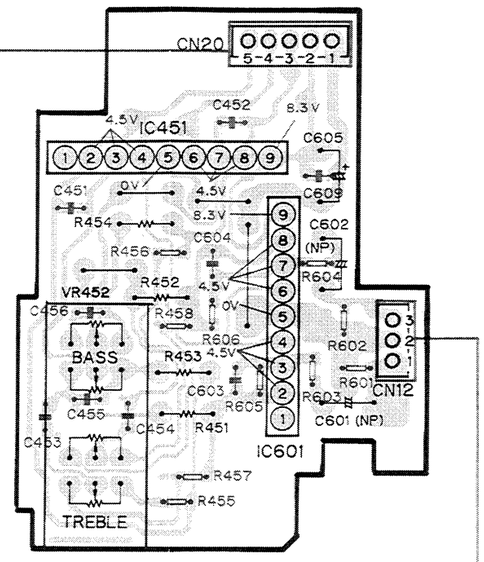
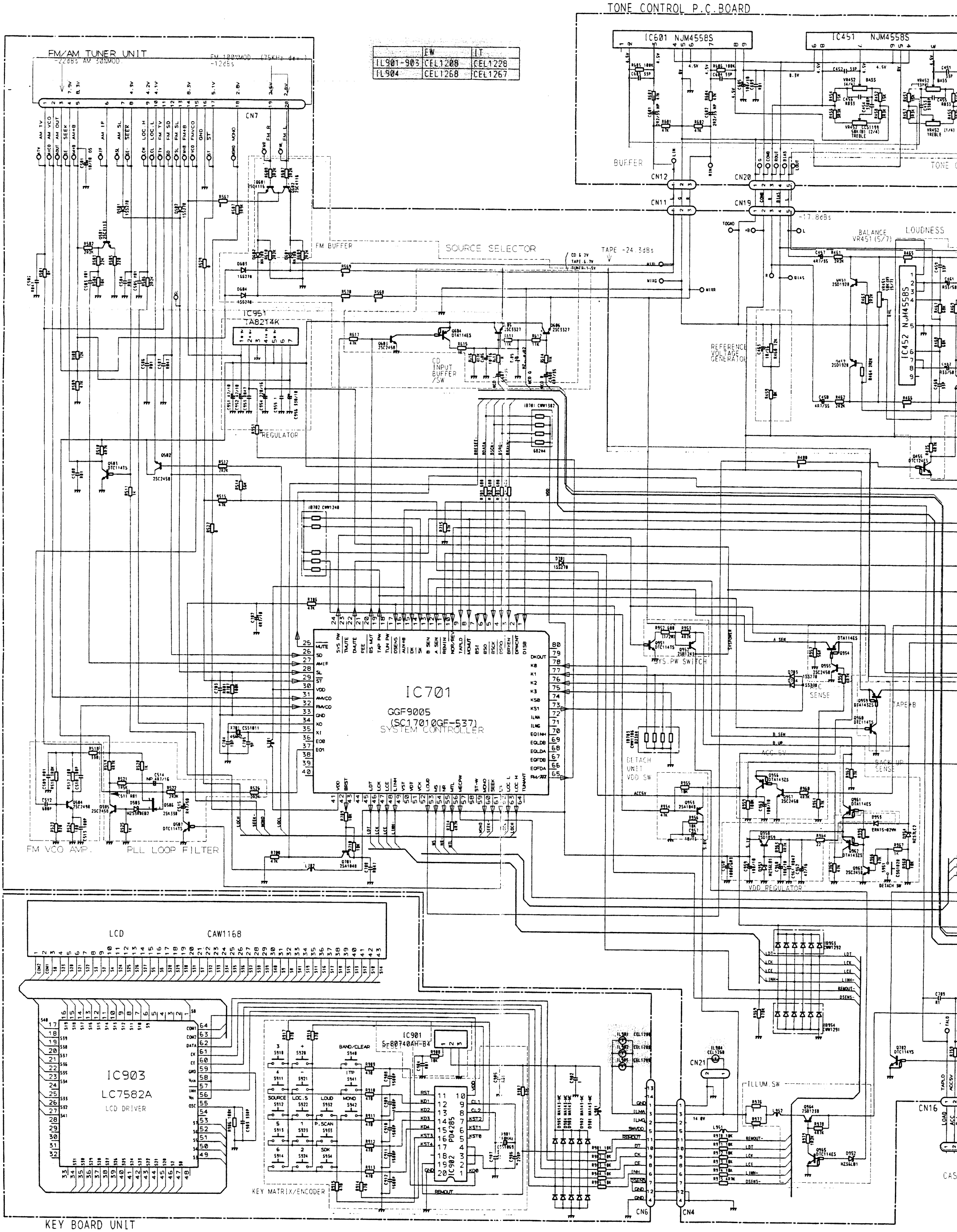


Fig. 20

17. SCHEMATIC CIRCUIT DIAGRAM (KEH-M4500/EW, IT)

	EW	IT
IL901-903	CEL1208	CEL1228
IL904	CEL1268	CEL1267



TUNER AMP UNIT
Consists of
Tuner Amp P.C.Board
Tone Control P.C.Board
Pre Out P.C.Board

TUNER AMP P.C BOARD

PRE OUT P.C.BOARD

IC451 NJM4558S

TONE CONTROL

IC851 NJM2068S

PRE-OUT

RCA REAR

IC452 NJM4558S

BALANCE VR451 (5/7)

LOUDNESS

VOLUME VR451 (6, 7/7)

PRE-FADER VR451 (3, 4/7)

POWER FADER

-22.2dB

-22.5dB

-17.8dBs

-3.6dBs

+19.5dBs

IC551 TA8215H-A

STAND-BY CONTROL

POWER AMP.

SYSTEM CONTROL DRIVER

MUTE CONTROL

SYSPOWER

IC251 MB3106M

TAPE EQ

IC301 CXA1102P

DOLBY B-TYPE NR

IC401 AN6263N

MUSIC SEARCH

-3.8dBs (CD 0dB)

ACC SENSE

BACK UP SENSE

AMC SENSE

DETACH SW

TAPE MECHA. SW

CN1 CN2 CN3 CN8A CN8B CN13 CN14 CN15 CN16

CD-M

TO CASSETTE MECHANISM ASSY

NOTE:

Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

SWITCH:
TUNER AMP P.C.BOARD
S951 DETACH SWITCH ..... ON-OFF

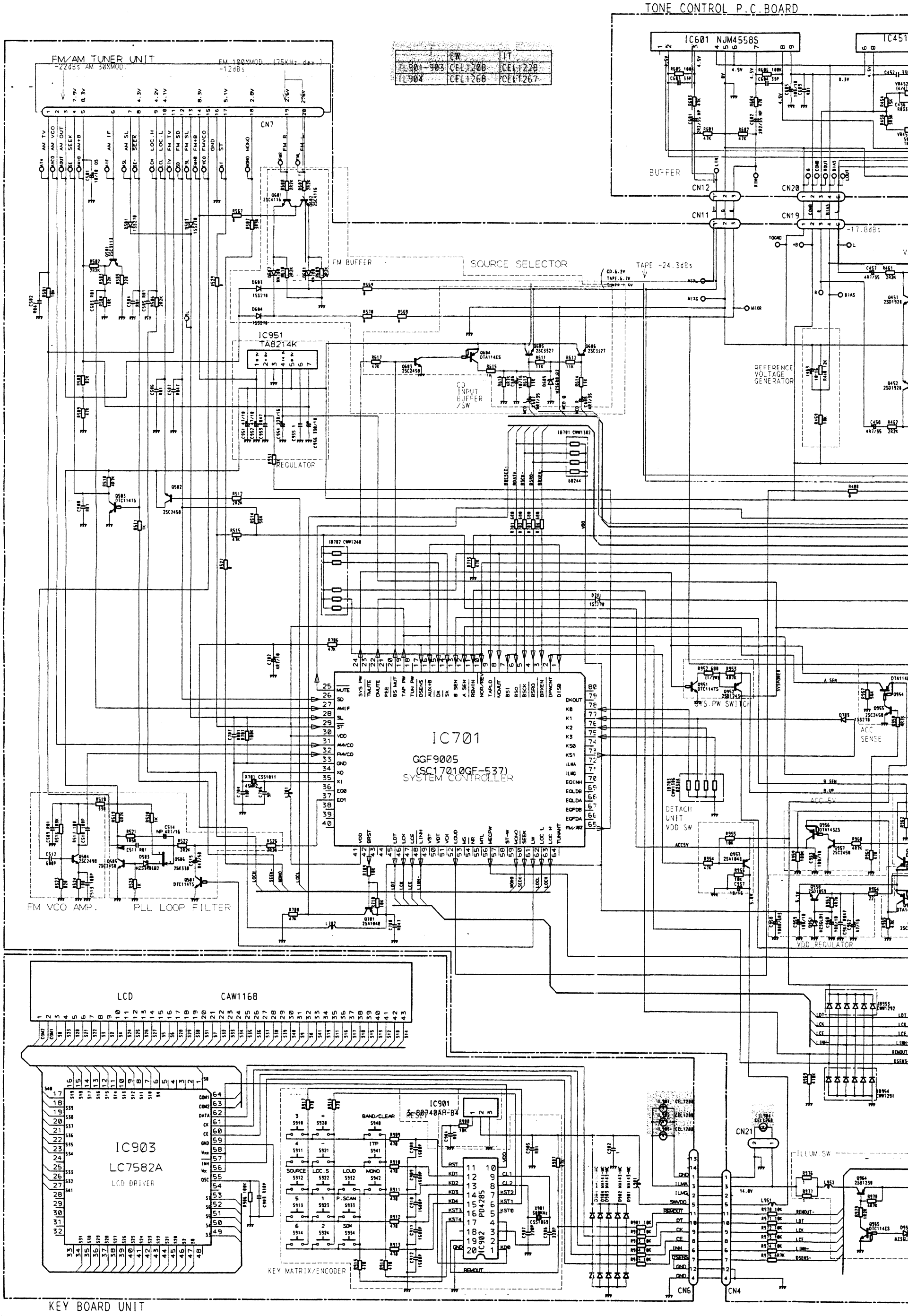
The underlined indicates switch position.

Decimal points for resistor and capacitor fixed values are expressed as
2.2→2R2
0.022→R022

Fig. 21

18. SCHEMATIC CIRCUIT DIAGRAM (KEH-M4000/EW, IT)

	EW	IT
IL901-903	CEL1208	CEL1228
IL904	CEL1268	CEL1267



EH-M4000/EW, IT)

	EW	IT
IL901-903	CEL1208	CEL1228
IL904	CEL1268	CEL1267

TONE CONTROL P.C.BOARD

IC601 NJM4558S

IC451 NJM4558S

BUFFER

TONE CONTROL

CN12 CN20 CN11 CN19

TUNER AMP P.C.BOARD

CN13

-22.2dBs

-17.8dBs

-22.5dBs

TOGND +B L R BIAS MIXG MIXR

FM BUFFER

SOURCE SELECTOR

TAPE -24.3dBs

CD.6.2V TAPE.6.7V TUNER 4.6V

BALANCE VR451 (5/7)

LOUDNESS

VOLUME VR451 (6,7/7)

PRE-FADER VR451 (3,4/7)

POWER FADER

IC951 TA8214K

REGULATOR

CD INPUT BUFFER /SW

REFERENCE VOLTAGE GENERATOR

IC452 NJM4558S

IB701 CWW1382

IB787 CWW1248

IC701

GGF9005

(SC17010GF-537)

SYSTEM CONTROLLER

SYS.PW SWITCH

ACC SENSE

TAPE B

DETACH UNIT VDD SW

ACC 5V

BACK UP SENSE

VDD REGULATOR

DETACH SW

MUTE CONTROL

SYSPOWER

TAPE EQ

IC251 MB3106M

TAPE MECHA. SW

IC901 S-80740AR-B4

RESET

KEY MATRIX/ENCODER

ILLUM. SW

CN21

CN16 CN15

TO CASSETTE MECHANISM ASSY

CN6 CN4

NOTE:

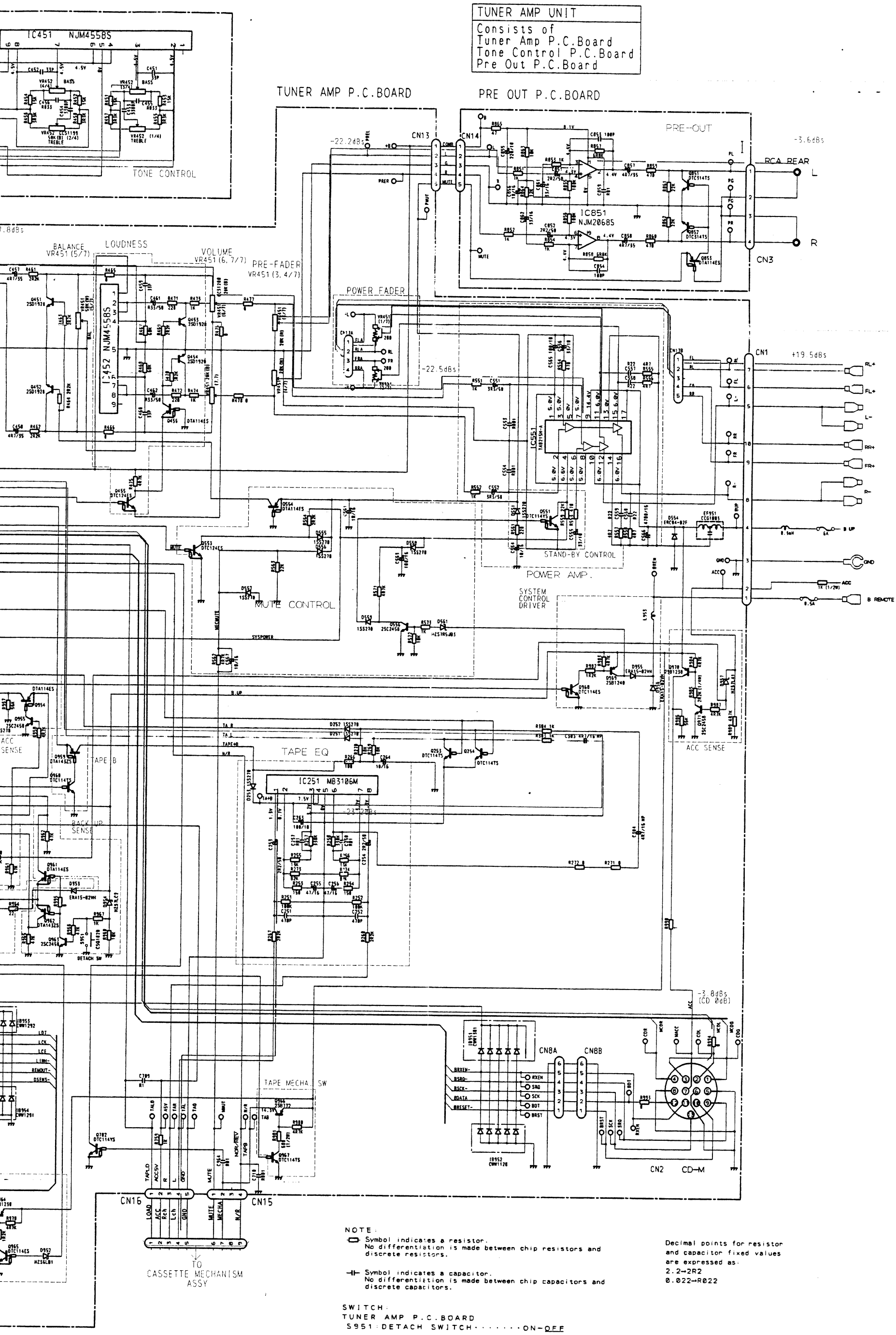
Symbol indicates a r
No differentiation
discrete resistors.

Symbol indicates a c
No differentiation
discrete capacitors.

SWITCH:
TUNER AMP P.C.BO
S951:DETACH SWI

The underlined

TUNER AMP UNIT
Consists of Tuner Amp P.C.Board Tone Control P.C.Board Pre Out P.C.Board



NOTE:

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

SWITCH:
TUNER AMP P.C.BOARD
S951: DETACH SWITCH·····ON-OFF

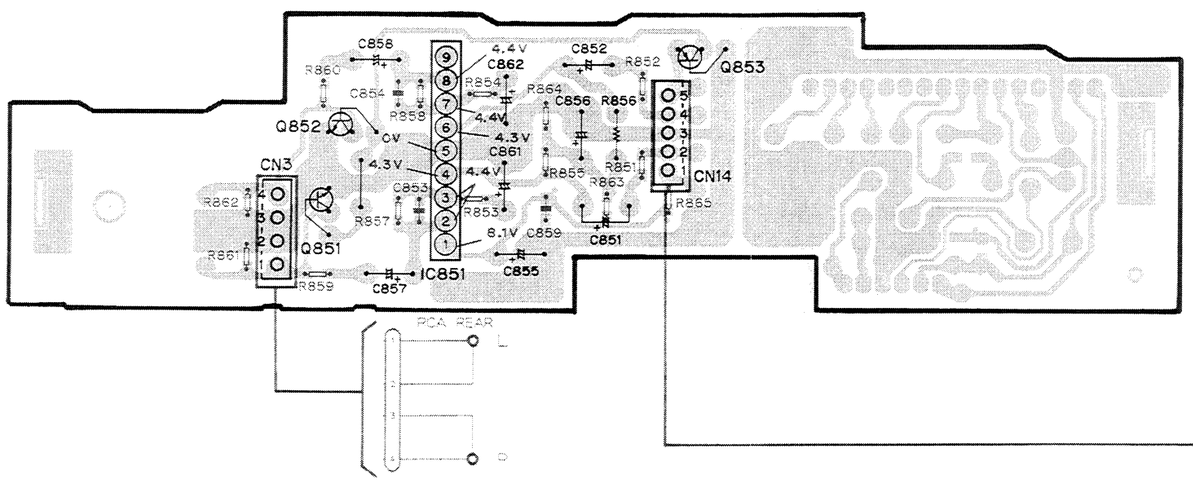
The underlined indicates switch position.

Fig. 22

19. CONNECTION DIAGRAM (KEH-M4000/EW, IT)

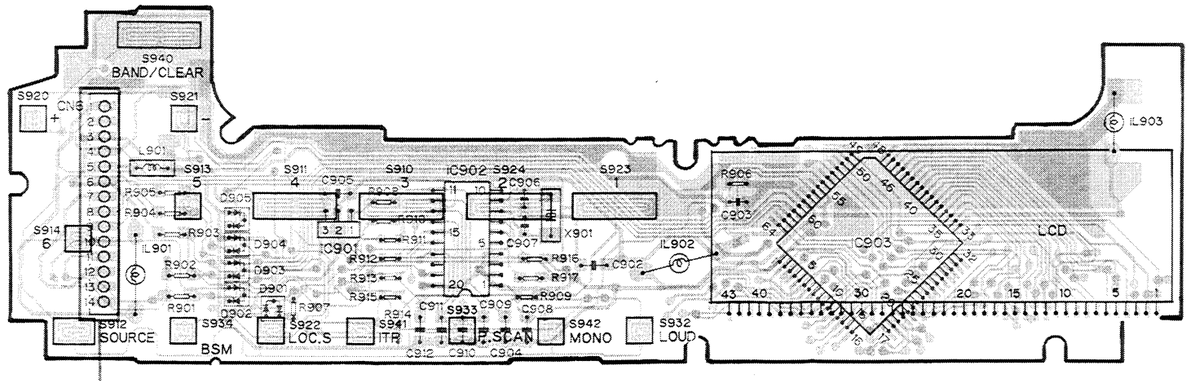
PRE OUT P.C. BOARD

IC. Q Q851 Q852 IC851 Q853



KEY BOARD UNIT

IC IC901 IC902 IC903

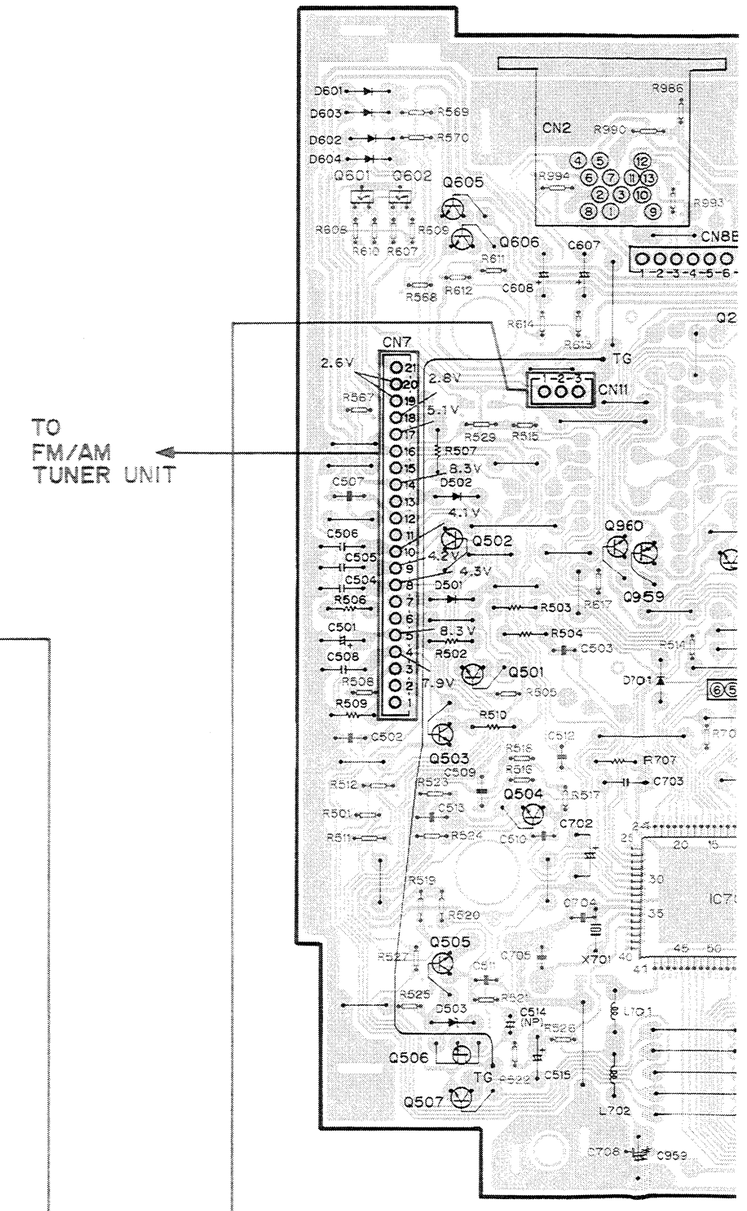


TUNER AMP P.C. BOARD

Q605 Q606
Q502 Q501
Q503 Q506

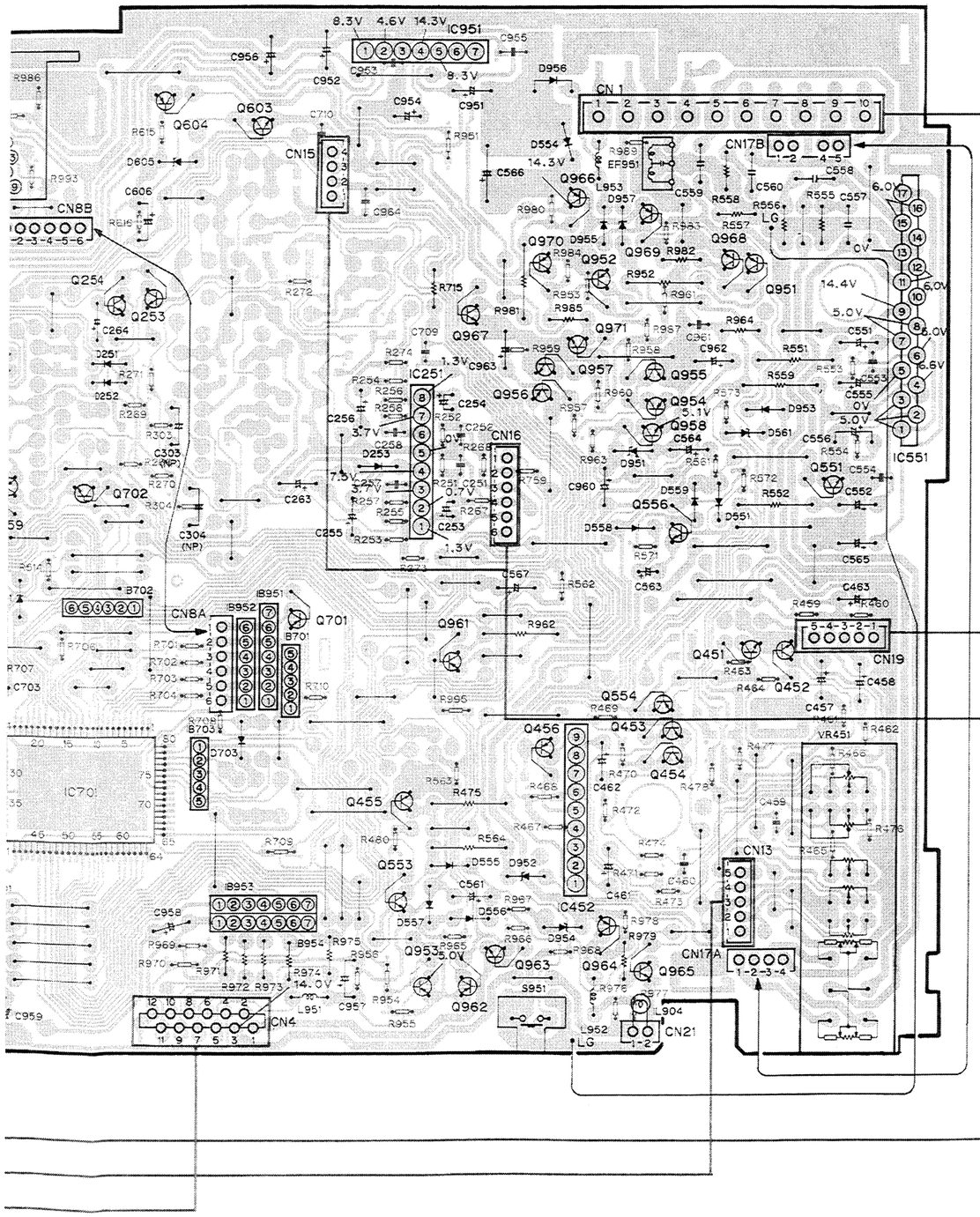
IC. Q Q601 Q602 Q505 Q507 Q504 Q960 Q959

ADJ.



7 8 9 10 11

Q967 Q970 Q556 Q969 Q554
IC251 IC951 Q957 Q952 Q955 Q453 Q968
Q702 Q604 Q603 Q455 Q961 Q956 Q966 Q971 Q954 Q454 Q951
Q959 IC701 Q254 Q253 Q701 Q553 Q953 Q962 Q963 Q456 IC452 Q964 Q958 Q965 Q451 Q952 Q551 IC551



TO
CASSETTE MECHANISM
ASSY

TONE CONTROL P.C. BOARD

IC IC451 IC601

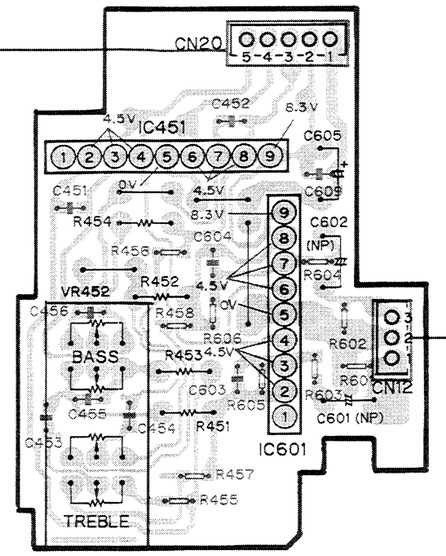
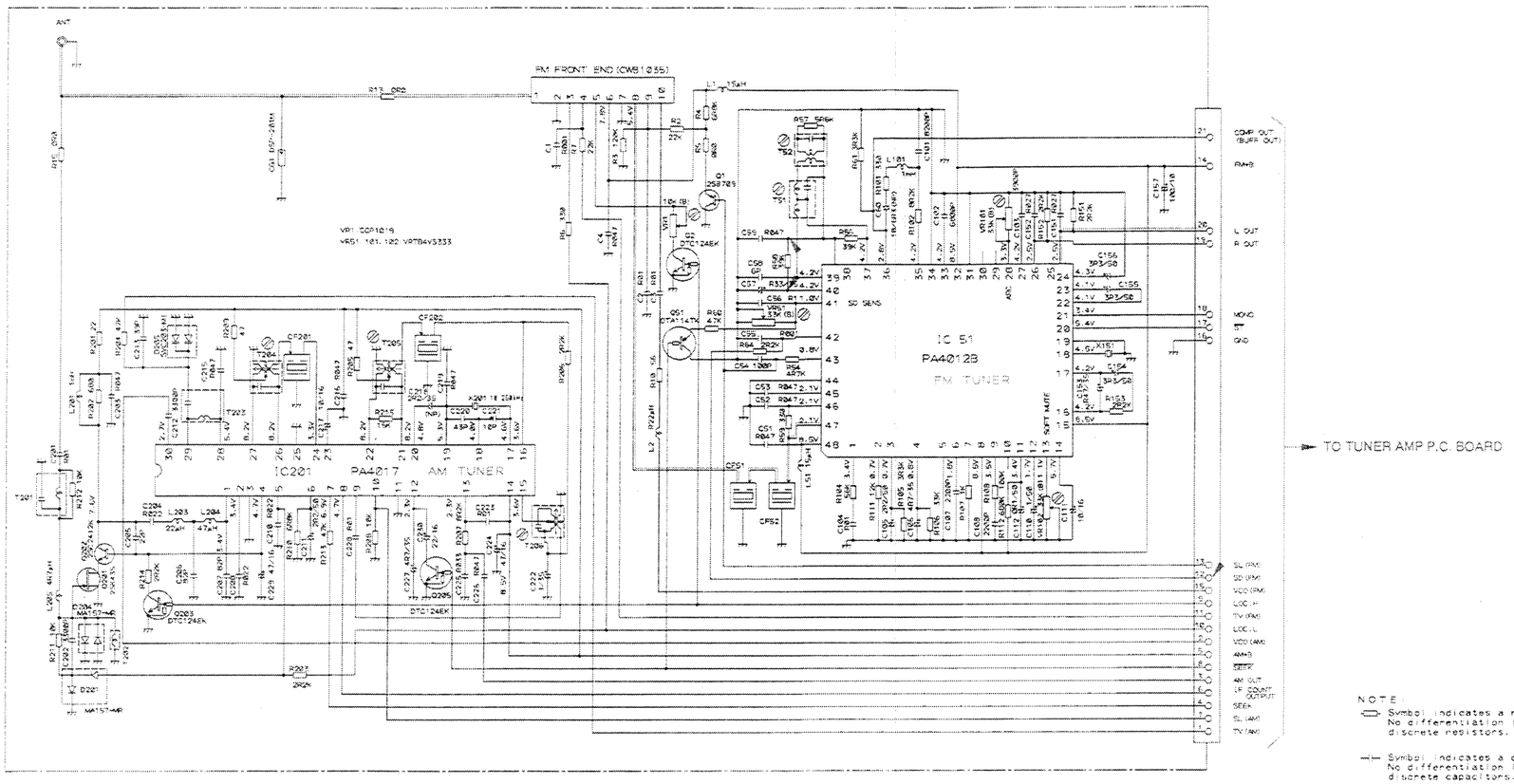


Fig. 23

52 7 8 9 53 10 11 12 54

20. CIRCUIT DIAGRAM AND PATTERN

20.1 FM/AM TUNER UNIT (KEH-M4500SDK/WG, KEH-M4000SDK/WG)



NOTE

⇨ Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

⊣⊢ Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

Fig. 24

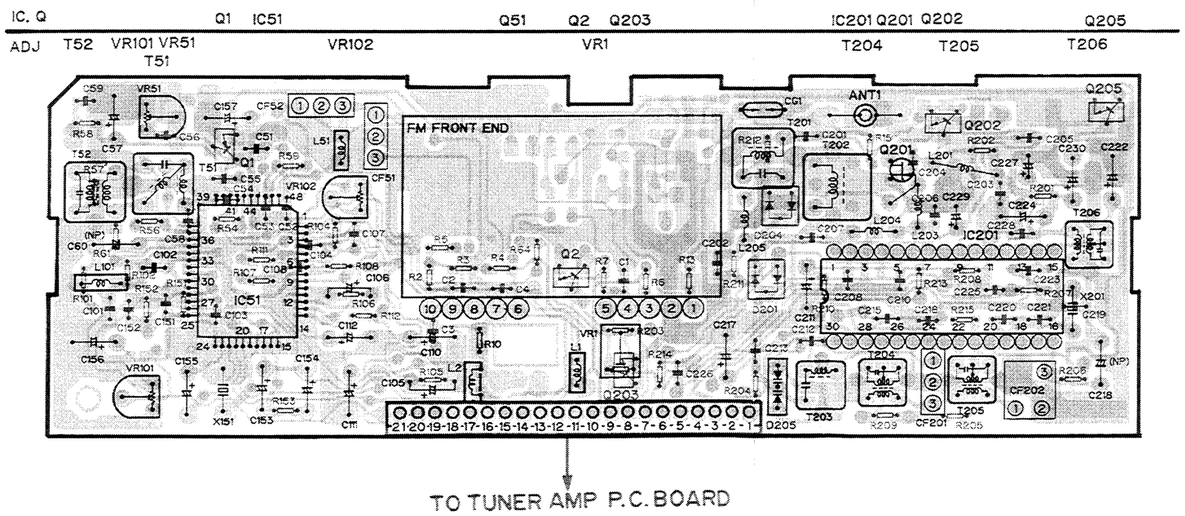

IC. Q Q1 IC51 Q51 Q2 Q203 IC201 Q201 Q202 Q205
ADJ T52 VR101 VR51 T51 VR102 VR1 T204 T205 T206
FM FRONT END
IC51
IC201
TO TUNER AMP P.C. BOARD

Fig. 25

20.2 FM/AM TUNER UNIT (KEH-M4500/EW, IT, KEH-M4000/EW, IT)

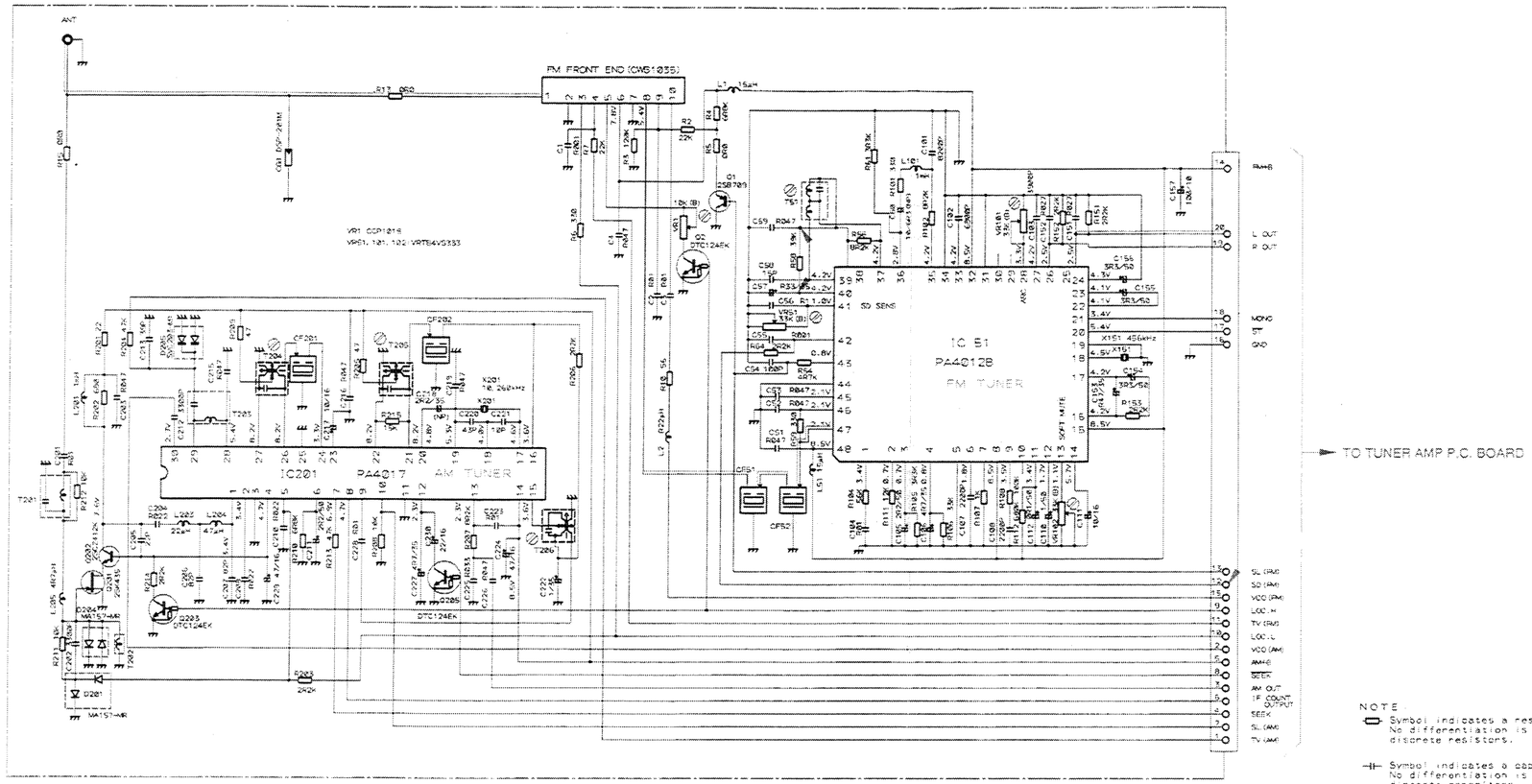


Fig. 26

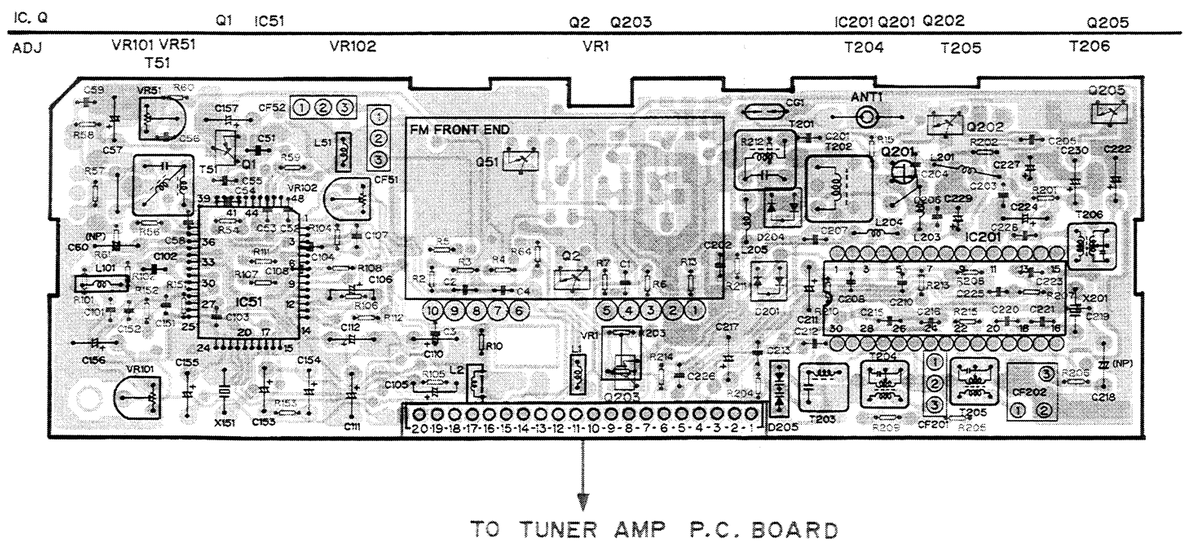


Fig. 27

20.3 CASSETTE MECHANISM ASSY (KEH-M4500SDK/WG, KEH-M4500/EW, IT)

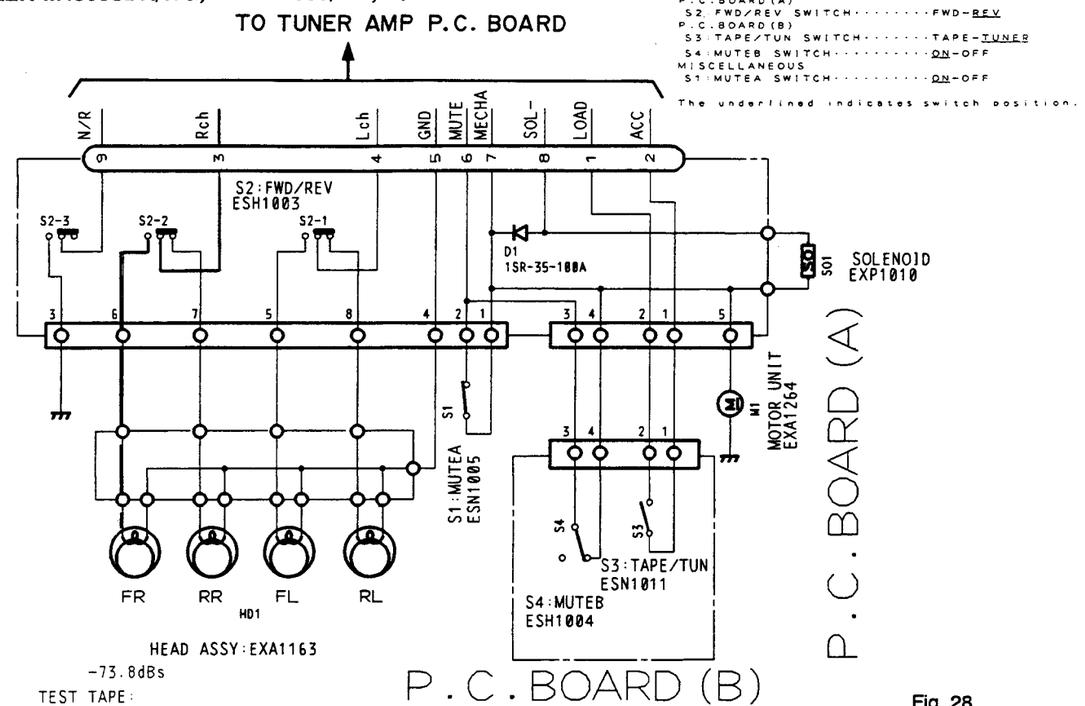


Fig. 28

P.C. BOARD (A)

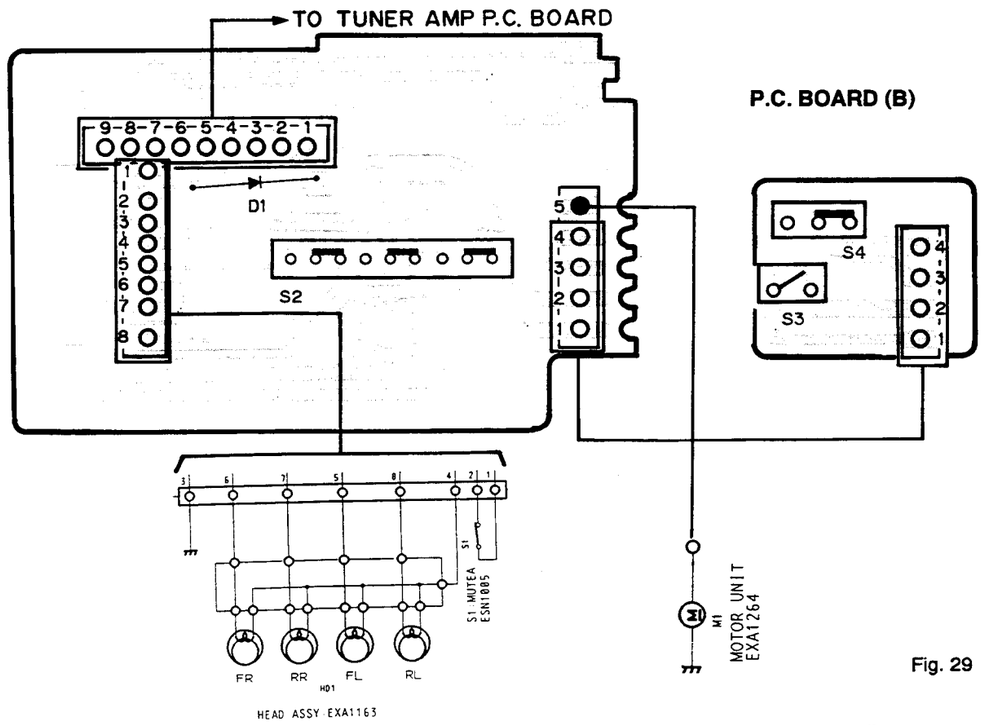


Fig. 29

20.4 CASSETTE MECHANISM ASSY (KEH-M4000SDK/WG, KEH-M4000/EW, IT)

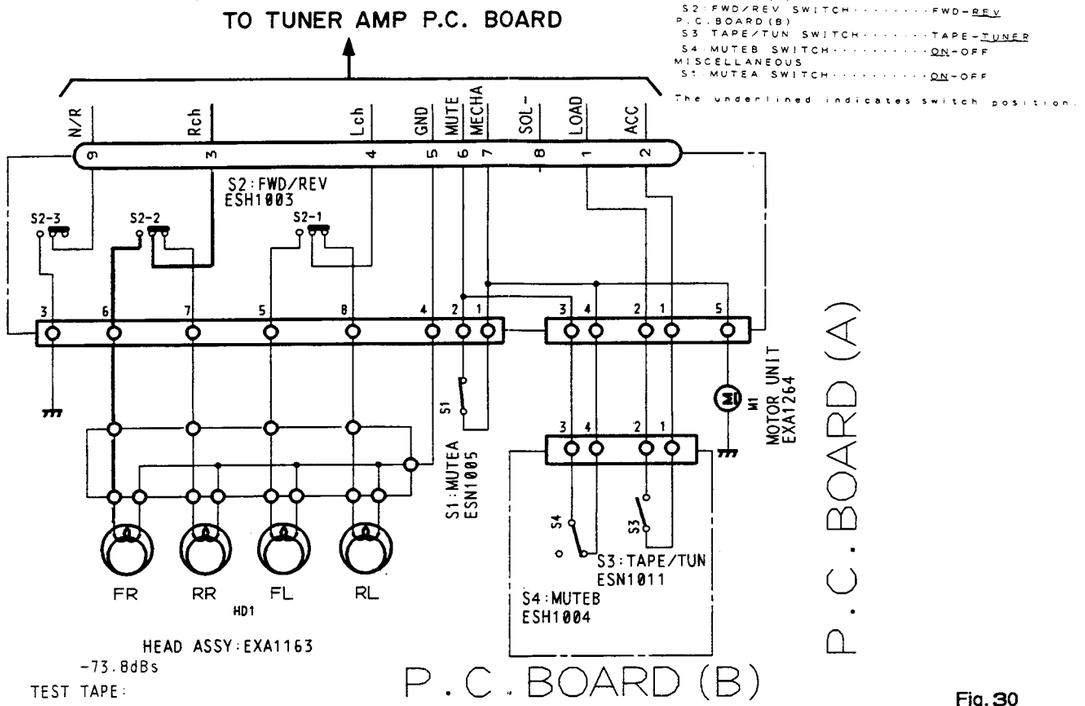


Fig. 30

P.C. BOARD (A)

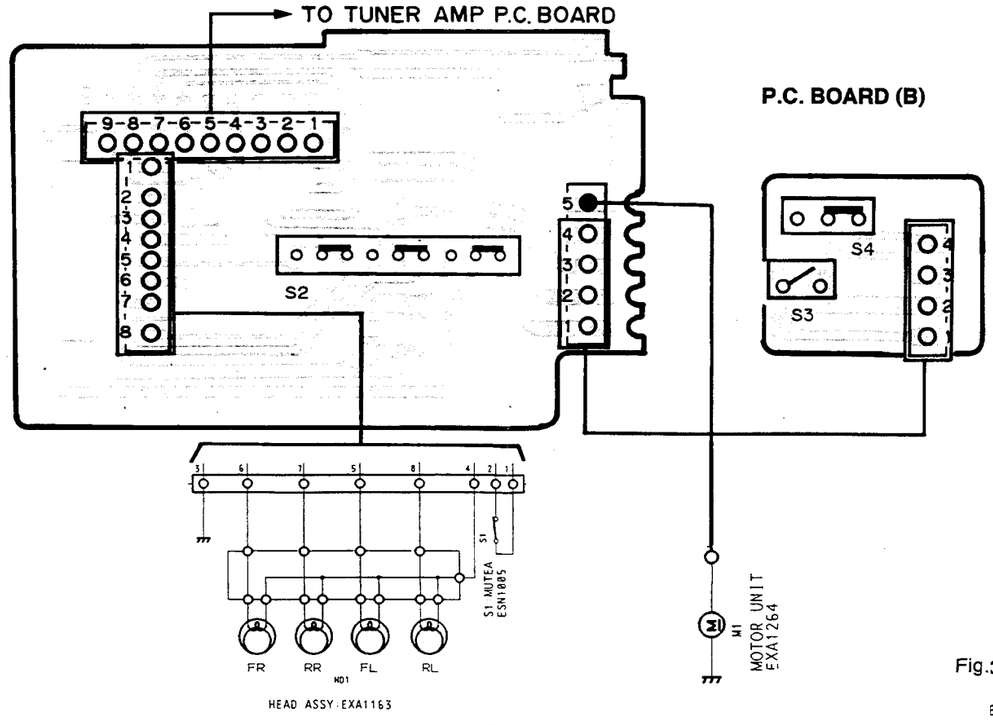


Fig. 31

21. CHASSIS EXPLODED VIEW

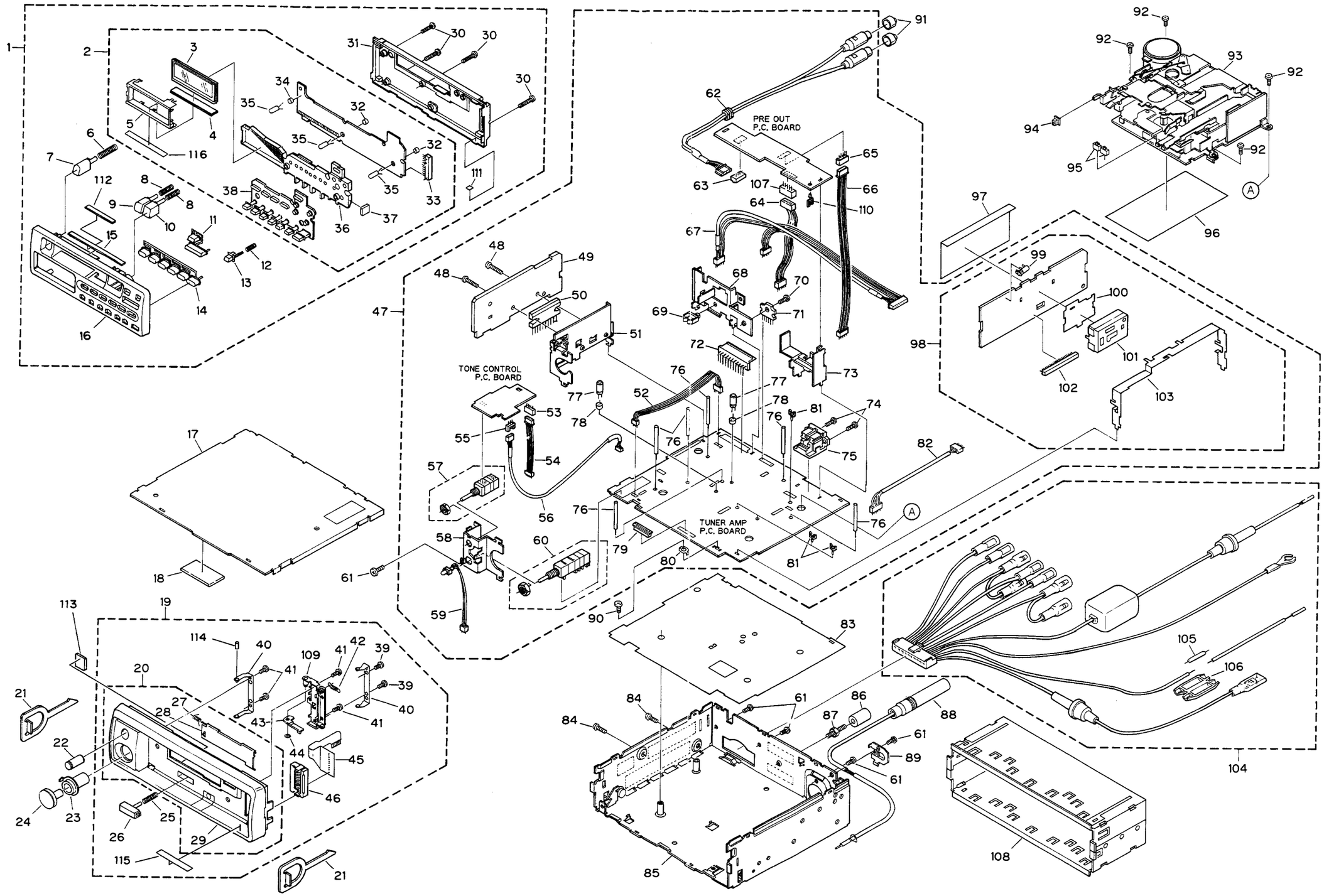


Fig. 32

● Parts List (KEH-M4500SDK/WG)

NOTES:
- *Parts marked by "✱" or "✱" are generally unavailable because they are not in our Master Spare Parts List.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Mark	No.	Description	Part No.
	1	Detach Grille Assy	CXA4764
◉	2	Key Board Unit	CWM3093
	3	LCD	CAW1168
	4	Connector	CNV3076
✱	5	Holder	CNC4220
	6	Spring	CBH1455
	7	Button(⏏)	CAC3218
	8	Spring	CBH1388
	9	Button(⏮)	CAC3112
	10	Button(⏭)	CAC3219
	11	Button Unit(●,-,+)	CAC3216
	12	Spring	CBH1446
	13	Button(⏏)	CAC3217
	14	Button Unit(1-6)	CAC3215
	15	Spacer	CNC4296
	16	Grille Unit	CXA4919
✱	17	Case	CNB1506
✱	18	Cushion	CNM3203
	19	Panel Assy	CXA4782
	20	Panel Unit	CXA4812
	21	Handle	CNC3664
	22	Knob	CAA1305
	23	Knob	CAA1233
	24	Knob	CAA1234
	25	Spring	CBH1440
	26	Button	CAC3049
	27	Spring	CBH1215
	28	Door	CAT1451
✱	29	Panel	CNS2424
	30	Screw	BPZ20P100FZK
	31	Cover	CNS2422
	32	Spacer	CNW-662
	33	Plug(13P)(CN6)	CKS2292
	34	Bush	CNW-855
	35	Lamp(IL901,902,903)	CEL1208
	36	Lens	CNV3101
✱	37	Cushion	CNM3476
	38	Switch Unit	CXA4740
	39	Screw	BMZ20P025FMC
	40	Holder Unit	CXA5085
	41	Screw	BPZ20P060FMC
	42	Spring	CBH1395
	43	Arm Unit	CXA4332
	44	Washer	CBF1037
	45	P.C.Board	CNP2984
	46	Socket	CKS2293
◉	47	Tuner Amp Unit	CWM3078
	48	Screw	BSZ30P140FMC
✱	49	Heat Sink	CNC3890
	50	IC(IC551)	TA8215H-A
✱	51	Holder	CNC4223
✱	52	Connector(4P↔5P)(CN17)	CDE3647
	53	Plug(5P)(CN20)	CKS1038
✱	54	Connector(5P)(CN19)	CDE3643
✱	55	Plug(3P)(CN12)	CKS1666
✱	56	Connector(3P)(CN11)	CDE3421
	57	Volune(VR452)	CCS1199
✱	58	Holder	CNC4222
	59	Lamp(IL904)(CN21)	CEL1268
	60	Volune(VR451)	CCS1200
	61	Screw	BSZ30P050FMC
	62	Connector(4P↔RCA)(CN103)	CDE3649
✱	63	Plug(4P)(CN3)	CKS1238
✱	64	Connector(6P)(CN9)	CDE3645
	65	Plug(5P)(CN14)	CKS1038
✱	66	Connector(5P)(CN13)	CDE3644
	67	Connector(4P,5P↔9P)(CN15)(CN16)	CDE3658
✱	68	Holder	CNC4224
✱	69	Clamper	CNV1343
	70	Screw	BSZ30P080FMC

Mark	No.	Description	Part No.
	71	IC(IC951)	TA8214K
	72	Plug(10P)(CN1)	CKS-467
✱	73	Holder	CNC4225
	74	Screw	BMZ26P050FMC
	75	Connector(13P)(CN2)	CKS1832
✱	76	Clamper	CEF1006
	77	Capacitor(C253,254)	CCH1145
	78	Spacer	CNW-662
	79	Connector(12P)(CN4)	CKS1260
✱	80	Holder	CNC2218
	81	Clamper	CNV1335
✱	82	Connector(6P)(CN8)	CDE3602
✱	83	Insulator	CNM3322
	84	Screw	BSZ30P100FMC
✱	85	Chassis Unit	CXA4688
	86	Bush	CNV1009
	87	Screw	CBA1002
	88	Antenna Cable	CDH1128
✱	89	Holder	CNC2913
	90	Screw	BSZ30P055FUC
	91	Cap	CNW-829
	92	Screw	BMZ26P050FMC
◉	93	Cassette Mechanism Assy	EXK1786
	94	Button	CAC2819
	95	Button	CAC2820
✱	96	Insulator	CNM3467
✱	97	Insulator	CNM3487
◉	98	FM/AM Tuner Unit	CWE1227
	99	Antenna Jack(A1)	CKX1010
✱	100	Insulator	CNM2105
	101	FM Front End	CWB1035
✱	102	Plug(21P)(CN7)	CKS1735
✱	103	Holder	CNC2880
	104	Cord Assy	CDE3737
	105	Resistor	RS1/2P102JL
	106	Cap	CNS1472
	107	Plug(6P)(CN10)	CKS1039
✱	108	Holder	CNC3342
	109	Holder Unit	CXA4687
	110	Clamper	CNV1335
✱	111	Cushion	CNM3214
✱	112	Spacer	CNM3522
	113	Spacer	CNM3521
	114	Cushion	CNM3366
	115	Spacer	CNM3529
✱	116	Insulator	CNM3527

- The KEH-M4000SDK/WG, KEH-M4500/EW, KEH-M4500/IT, KEH-M4000/EW and KEH-M4000/IT Parts Lists enumerate the parts which differ from those enumerated in the KEH-M4500SDK/WG Parts List only. The parts other than those enumerated in the former are indentical with those in the latter, to which you are requested to refer, accordingly.
The KEH-M4500SDK/WG Parts List is given on page 63.

			KEH-M4500SDK/WG	KEH-M4000SDK/WG	KEH-M4500/EW	KEH-M4500/IT	KEH-M4000/EW	KEH-M4000/IT
Mark	No.	Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
	1	Detach Grille Assy	CXA4764	CXA4777	CXA4761	CXA4763	CXA4774	CXA4776
◉	2	Key Board Unit	CWM3093	CWM3093	CWM3093	CWM3094	CWM3093	CWM3094
	16	Grille Unit	CXA4919	CXA4928	CXA4918	CXA4918	CXA4927	CXA4927
	35	Lamp	CEL1208	CEL1208	CEL1208	CEL1228	CEL1208	CEL1228
◉	47	Tuner Amp Unit	CWM3078	CWM3091	CWM3075	CWM3077	CWM3088	CWM3090
	59	Lamp	CEL1268	CEL1268	CEL1268	CEL1267	CEL1268	CEL1267
✱	64	Connector	CDE3645	CDE3645	·····	·····	·····	·····
	67	Connector	CDE3658 (4P,5P↔9P)	CDE3725 (3P,5P↔8P)	CDE3658 (4P,5P↔9P)	CDE3658 (4P,5P↔9P)	CDE3725 (3P,5P↔8P)	CDE3725 (3P,5P↔8P)
✱	85	Chassis Unit	CXA4688	CXA4820	CXA4821	CXA4821	CXA4821	CXA4821
◉	93	Cassette Mechanism Assy	EXK1786	EXK1776	EXK1786	EXK1786	EXK1776	EXK1776
◉	98	FM/AM Tuner Unit	CWE1227	CWE1227	CWE1228	CWE1228	CWE1228	CWE1228
✱	102	Plug	CKS1735(21P)	CKS1735(21P)	CKS1628(20P)	CKS1628(20P)	CKS1628(20P)	CKS1628(20P)
	104	Cord Assy	CDE3737	CDE3737	CDE3505	CDE3505	CDE3505	CDE3505
	107	Plug	CKS1039	CKS1039	·····	·····	·····	·····
	110	Clamper	CNV1335	CNV1335	·····	·····	·····	·····

22. CASSETTE MECHANISM ASSY EXPLODED VIEW

● KEH-M4500SDK/WG, KEH-M4500/EW, IT

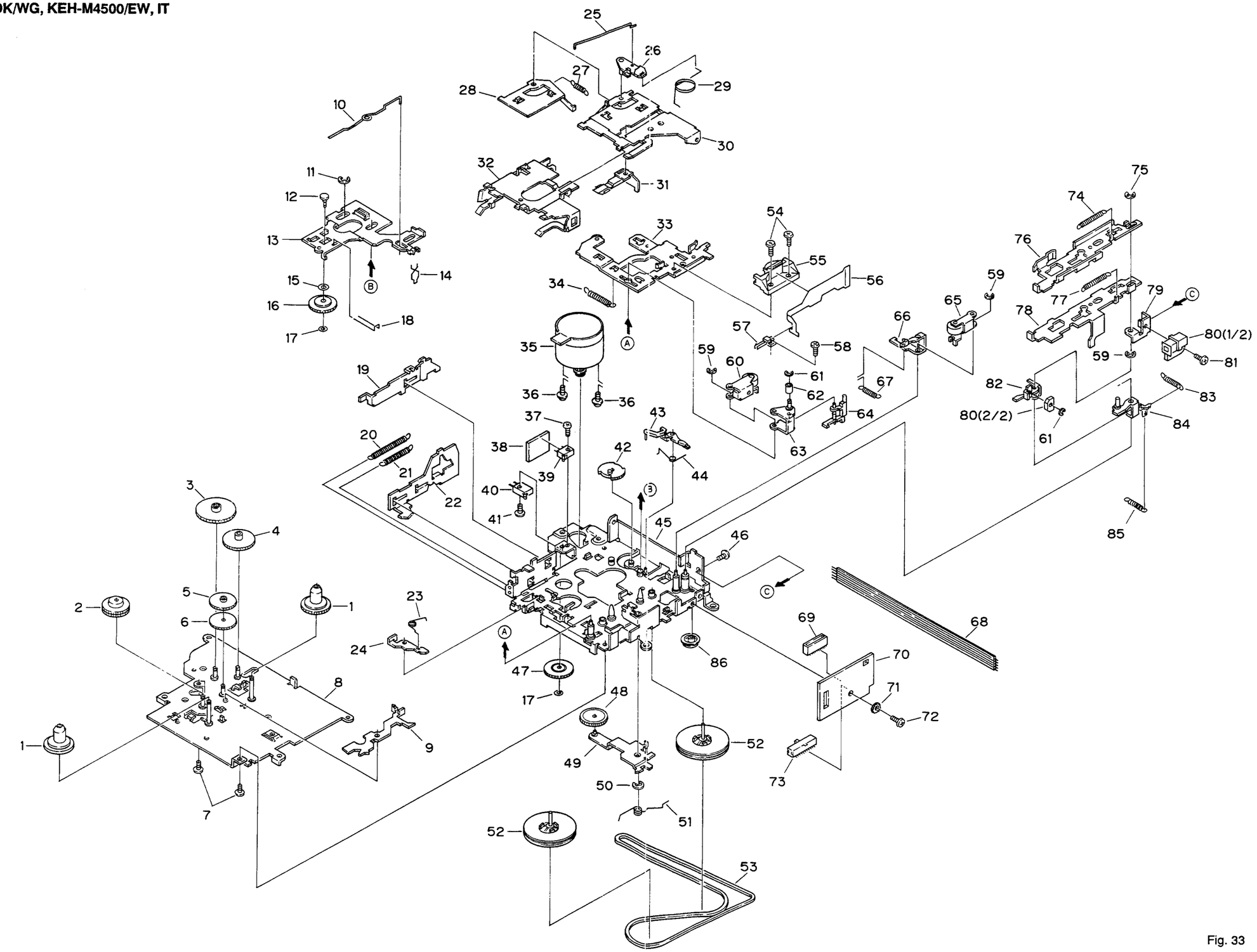


Fig. 33

● **Parts List (KEH-M4500SDK/WG, KEH-M4500/EW, IT)**

Mark No.	Description	Part No.
1	Reel Unit	EXA1251
2	Gear Unit	EXA1206
3	Gear	ENV1203
4	Gear	ENV1204
5	Gear	ENV1273
6	Gear	ENV1211
7	Screw	BMZ20P025FMC
8	Sub Chassis Unit	EXA1261
9	Arm	ENV1210
10	Spring	EBH1381
11	Washer	YE25FUC
12	Shaft	ELA1266
13	Lever	ENC1275
14	Spring	EBH1361
15	Washer	EBF1015
16	Gear	ENV1208
17	Washer	CBF1037
18	Spring	EBH1362
19	Lever	ENC1302
20	Spring	EBH1359
21	Spring	EBH1358
22	Lever	ENC1256
23	Spring	EBH1373
24	Arm	ENC1248
25	Spring	EBH1308
26	Arm Unit	EXA1198
27	Spring	EBH1364
28	Arm	ENC1263
29	Spring	EBH1374
30	Frame	ENC1204
31	Lever	ENV1287
32	Holder	ENC1257
33	Head Base Unit	EXA1258
34	Spring	EBH1363
35	Motor Unit(M1)	EXA1264
36	Screw	PMS26P025FUC
37	Screw(M2×5)	CBA1054
38	Gathering P.C.Board	ENX1017
39	Switch(S4)(MuteB)	ESH1004
40	Switch(S3)(Tape/Tun)	ESN1011
41	Screw(M1.7×5.5)	CBA1025
42	Gear	ENV1205
43	Arm	ENV1206
44	Spring	EBH1317
45	Chassis Unit	EXA1267
46	Screw	JFZ20P025FNI
47	Gear	ENV1267
48	Gear	ENV1209
49	Arm Unit	EXA1155
50	Washer	YE30FUC
51	Spring	EBH1310
52	Flywheel Unit	EXA1257
53	Belt	ENT1018
54	Screw(M2×5)	EBA1028
55	Head Assy(HD1)	EXA1163
56	P.C.Board	ENP1042
57	Switch(S1)(MuteA)	ESN1005
58	Screw(M1.7×3)	CBA1038
59	Washer	YE20FUC
60	Pinch Roller Unit	EXA1194
61	Washer	YE12FUC
62	Roller	ELA1250
63	Arm Unit	EXA1166
64	Arm	ENV1227
65	Pinch Roller Unit	EXA1193
66	Arm	ENC1266
67	Spring	EBH1368
68	Cord	EDD1008
69	Plug(9P)	CKS1056
70	Gathering P.C.Board	ENX1016
71	Washer	WH23FMC
72	Screw	BSZ23P050FMC
73	Switch(S2)(FWD/REV)	ESH1003
74	Spring	EBH1322
75	Washer	YE15FUC
76	Lever	ENC1246
77	Spring	EBH1365
78	Lever	ENC1247
79	Bracket	ENC1250
80	Solenoid(S01)	EXP1010
81	Screw(M2×6)	EBA1023
82	Arm Unit	EXA1158
83	Spring	EBH1375
84	Arm Unit	EXA1157
85	Spring	EBH1345
86	Pulley	ENV1291

● **KEH-M4000SDK/WG, KEH-M4000/EW, IT**

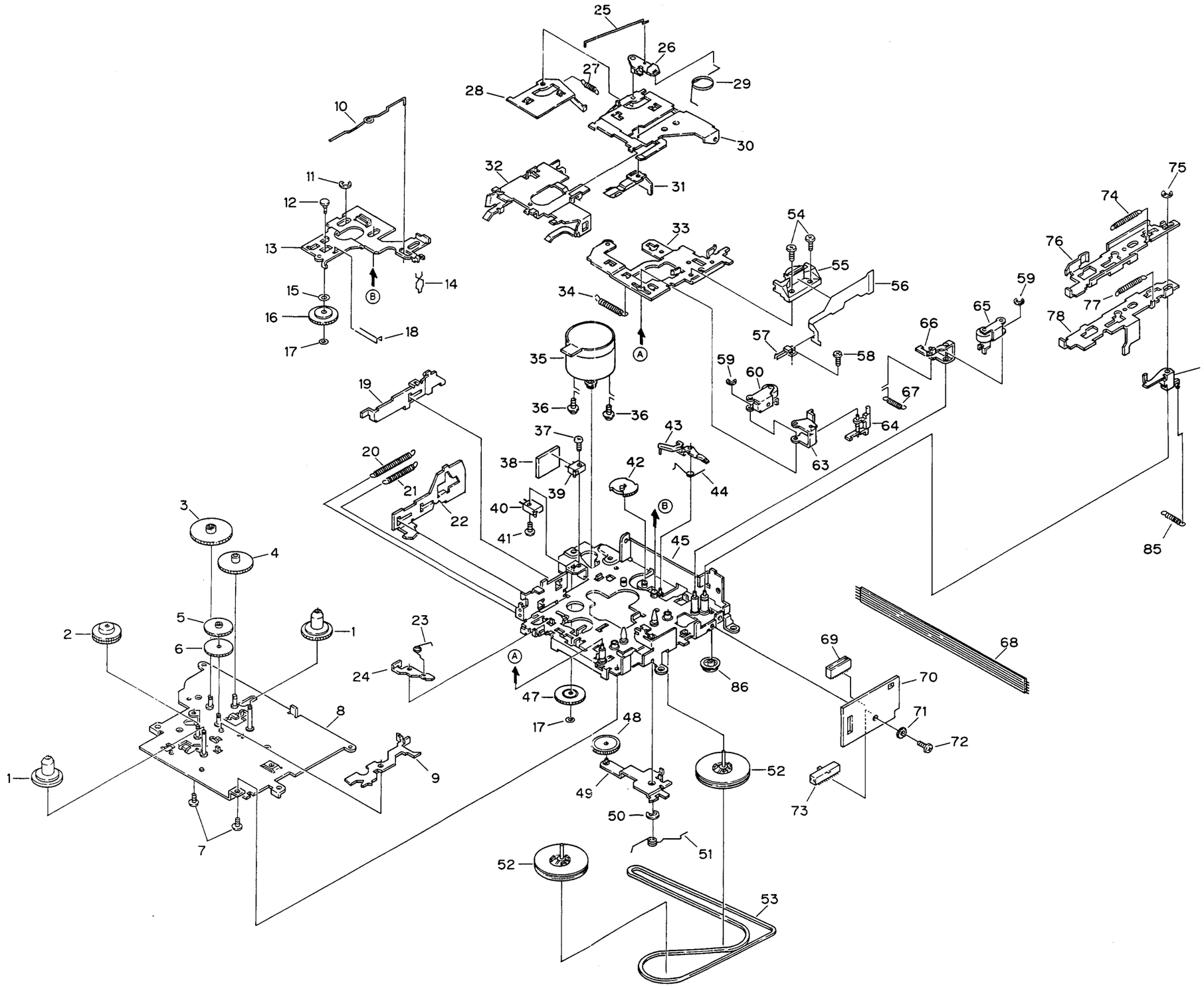


Fig. 34

• Parts List (KEH-M4000SDK/WG, KEH-M4000/EW, IT)

Mark No.	Description	Part No.
1	Reel Unit	EXA1251
2	Gear Unit	EXA1206
3	Gear	ENV1203
4	Gear	ENV1204
5	Gear	ENV1273
6	Gear	ENV1211
7	Screw	BMZ20P025FMC
8	Sub Chassis Unit	EXA1261
9	Arm	ENV1210
10	Spring	EBH1381
11	Washer	YE25FUC
12	Shaft	ELA1266
13	Lever	ENC1275
14	Spring	EBH1361
15	Washer	EBF1015
16	Gear	ENV1208
17	Washer	CBF1037
18	Spring	EBH1362
19	Lever	ENC1302
20	Spring	EBH1359
21	Spring	EBH1358
22	Lever	ENC1256
23	Spring	EBH1373
24	Arm	ENC1248
25	Spring	EBH1308
26	Arm Unit	EXA1198
27	Spring	EBH1364
28	Arm	ENC1263
29	Spring	EBH1374
30	Frame	ENC1204
31	Lever	ENV1287
32	Holder	ENC1257
33	Head Base Unit	EXA1258
34	Spring	EBH1363
35	Motor Unit(M1)	EXA1264
36	Screw	PMS26P025FUC
37	Screw(M2×5)	CBA1054
38	Gathering P.C.Board	ENX1017
39	Switch(S4)(MuteB)	ESH1004
40	Switch(S3)(Tape/Tun)	ESN1011
41	Screw(M1.7×5.5)	CBA1025
42	Gear	ENV1205
43	Arm	ENV1206
44	Spring	EBH1317
45	Chassis Unit	EXA1267
46	·····	
47	Gear	ENV1267
48	Gear	ENV1209
49	Arm Unit	EXA1155
50	Washer	YE30FUC
51	Spring	EBH1310
52	Flywheel Unit	EXA1257
53	Belt	ENT1018
54	Screw(M2×5)	EBA1028
55	Head Assy(HD1)	EXA1163
56	P.C.Board	ENP1042
57	Switch(S1)(MuteA)	ESN1005
58	Screw(M1.7×3)	CBA1038
59	Washer	YE20FUC
60	Pinch Roller Unit	EXA1194
61,62	·····	
63	Arm	ENC1213
64	Arm	ENV1227
65	Pinch Roller Unit	EXA1193
66	Arm	ENC1266
67	Spring	EBH1368
68	Cord	EDD1008
69	Plug(9P)	CKS1056
70	Gathering P.C.Board	ENX1016
71	Washer	WH23FMC
72	Screw	BSZ23P050FMC
73	Switch(S2)(FWD/REV)	ESH1003
74	Spring	EBH1365
75	Washer	YE15FUC
76	Lever	ENC1244
77	Spring	EBH1365
78	Lever	ENC1245
79-83	·····	
84	Arm	ENC1272
85	Spring	EBH1367
86	Pulley	ENV1291

23. PACKING METHOD

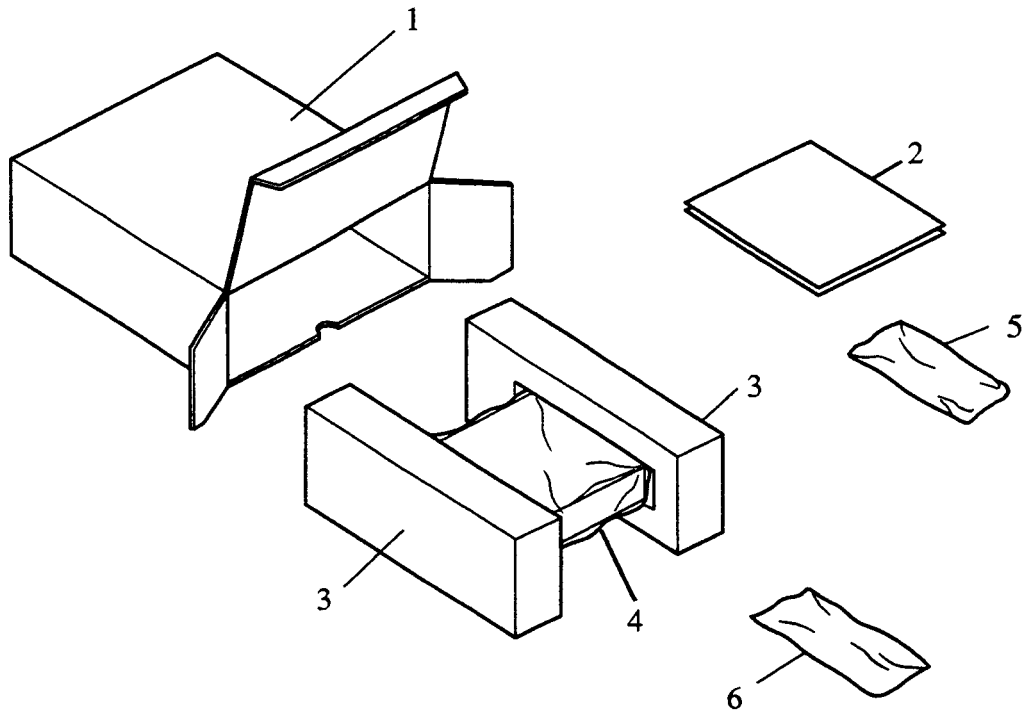


Fig. 35

●Parts List (KEH-M4500SDK/WG)

Mark	No.	Description	Part No.
	1	Carton	CHG2207
	2-1	Owner's Manual	CRD1589
*	2-2	Card	CRY-062
*	2-3	Passport	CRY1013
	3	Styrofoam	CHP1480
	4	Cover	CEG1092
	5	Accessory Assy	CEA1734
	5-1	Screw	CBA1002
	5-2	Cord	CDE1289
*	5-3	Polyethylene bag	CEG1011
	5-4	Handle(X2)	CNC3664
	5-5	Bush	CNV1009
	6	Cord Assy	CDE3737

●The KEH-M4000SDK/WG,KEH-M4500/EW,KEH-M4500/IT,KEH-M4000/EW and KEH-M4000/IT Parts Lists enumerate the parts which differ from those enumerated in the KEH-M4500SDK/WG Parts List only.

The parts other than those enumerated in the former are indentical with those in the latter,to which you are requested to refer, accordingly.

The KEH-M4500SDK/WG Parts List is given on page 72.

	KEH-M4500SDK/WG	KEH-M4000SDK/WG	KEH-M4500/EW	KEH-M4500/IT	KEH-M4000/EW	KEH-M4000/IT
Mark No. Description	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
1 Carton	CHG2207	CHG2208	CHG2201	CHG2204	CHG2202	CHG2205
2-1 Owner's Manual	CRD1589	CRD1589	CRD1586	CRD1592	CRD1586	CRD1592
* 2-3 Passport	CRY1013	CRY1013	•••••	•••••	•••••	•••••
6 Cord Assy	CDE3737	CDE3737	CDE3505	CDE3505	CDE3505	CDE3505

Owner's Manual

Part No.	Model	Language
CRD1589	WG	French,German
CRD1586	EW	English,French,German,Spanish,Dutch
CRD1592	IT	English,Italian,Swedish,Norwegian,Finnish,Portuguese

24. ELECTRICAL PARTS LIST

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*

Chip Resistor

RS1/□S□□□J,RS1/□□S□□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

●KEH-M4500SDK/WG

Unit Number :
Unit Name : FM/AM Tuner Unit

MISCELLANEOUS

======Circuit Symbol & No.	Part Name======	Part No.
IC 51		PA4012B
IC 201		PA4017
Q 1		2SB709
Q 2		DTC124EK
Q 51		DTA114TK
Q 201		2SK435
Q 202		2SC2412K
Q 203 205		DTC124EK
D 201 204		MA157-MR
D 205		SVC203-M1
L 1 51	Inductor	CTF1241
L 2	Inductor	CTF1086
L 101	Inductor	CTF1170
L 201	Ferri-Inductor	CTF1084
L 203	Ferri-Inductor	LAU220K
L 204	Ferri-Inductor	LAU470K
L 205	Ferri-Inductor	LAU4R7K
T 51	Coil	CTC1021
T 52	Coil	CTC1022
T 201	Coil	CTB1020
T 202	Coil	CTB1004
T 203	Coil	CTB1040
T 204	Coil	CTE1037
T 205	Coil	CTE1038
T 206	Coil	CTE1039
CG 1		DSP-201M-S00B
CF 51 52	Ceramic Filter	CTF-182
CF 201	Ceramic Filter	CTF1041
CF 202	Filter	CTF1085
X 151	Ceramic Resonator	CSS1055
X 201	Crystal Resonator	CSS1014
VR 1	Semi-fixed 10kΩ(B)	CCP1019
VR 51 101 102	Semi-fixed 33kΩ(B)	VRTB4VS333
	FM Front End	CWB1035

RESISTORS

======Circuit Symbol & No.	Part Name======	Part No.
R 2 7		RS1/10S223J
R 3		RS1/10S124J
R 4		RS1/10S682J
R 5		RS1/10S0R0J
R 6 59		RS1/10S331J
R 10		RS1/10S560J
R 13		RS1/10S0R0J
R 15		RS1/10S0R0J
R 54		RS1/10S472J
R 56 58		RS1/10S393J
R 57		RS1/10S562J
R 60		RS1/10S473J
R 61		RS1/10S332J
R 64		RS1/10S222J
R 101		RS1/10S331J
R 102		RS1/10S822J
R 104		RS1/10S563J
R 105		RS1/10S332J
R 106		RS1/10S333J
R 107		RS1/10S102J
R 108		RS1/10S104J
R 111		RS1/10S123J
R 112		RS1/10S684J
R 151 152		RS1/10S222J
R 153		RS1/10S222J
R 201		RS1/10S220J
R 202		RS1/10S681J
R 203 206 214		RS1/10S222J
R 204 213		RS1/10S473J
R 205 209		RS1/10S470J
R 207		RS1/10S822J
R 208 211 212		RS1/10S103J
R 210		RS1/10S682J
R 215		RS1/10S153J

CAPACITORS

======Circuit Symbol & No.	Part Name======	Part No.
C 1		CKSQYB102K50
C 2 3 104		CKSQYB103K50
C 4 59		CKSQYF473Z25
C 51		CKSQYF473Z25
C 52 53		CKSQYF473Z25
C 54		CCSQSL101J50
C 55		CKSQYB102K50
C 56		CKSQYF104Z25
C 57		CSZAR33K35
C 58		CCSQCH060D50
C 60		CEALNP100M6R3
C 101		CKSQYB822K50
C 102		CKSQYB682K50
C 103		CKSQYB392K50
C 105		CEA2R2M50LL
C 106		CEA4R7M35LL
C 107 108		CKSQYB222K50
C 110		CEA010M50LL
C 111		CEA100M16LL
C 112		CEA0R1M50LL
C 151 152		CKSQYB273K25
C 153		CSZAR47M35L
C 154 155 156		CEA3R3M50LL
C 157		CEA101M10LL
C 201 223 228		CKSQYB103K25
C 202 212		CKSQYB332K50
C 203 215 216 219 226		CKSQYF473Z25
C 204 208 210		CKSQYB223K25
C 205		CCSQCH220J50
C 206 207		CCSQCH820J50

C 211		CEA2R2M50LL
C 213		CCSQCH390J50
C 217		CEA100M16LL
C 218		CEA2R2M35NPLL
C 220		CCSQCH430J50
C 221		CCSQCH100D50
C 222		CSZA010K35L
C 224		CEA470M16LL
C 225		CKSQYB333K25
C 227		CEA4R7M35LL
C 229		CEA470M16LL
C 230		CEA220M16LL

Unit Number :
Unit Name : Tuner Amp Unit

Tuner Amp Unit
Consists of
●Tuner Amp P.C.Board
●Pre Out P.C.Board
●Tone Control P.C.Board

MISCELLANEOUS

IC 251		MB3106M
IC 301		CXA1102P
IC 401		AN6263N
IC 451 601		NJM4558S
IC 452		NJM4558S
IC 551		TA8215H-A
IC 701	(SC17010GF-537)	GGF9005
IC 751		KHAC02
IC 851		NJM2068S
IC 951		TA8214K
Q 251 252		2SC2458
Q 253 254 960 967		DTC114TS
Q 401		DTC114YS
Q 451		2SD1920
Q 452 453 454		2SD1920
Q 455 553		DTC124ES
Q 456 554 604 954 961		DTA114ES
Q 501		2SC3113
Q 502 505 556 603 955 957 963 971		2SC2458
Q 503 507 951		DTC114TS
Q 504		2SC2498
Q 506		2SK330
Q 551		DTC114YS
Q 555		DTC114ES
Q 601 602		2SC4116
Q 605 606		2SC3327
Q 701 953		2SA1048
Q 702		DTC114YS
Q 751		2SC2458
Q 752		2SD1920
Q 753		DTC124ES
Q 851 852		DTC314TS
Q 853		DTA114ES
Q 952		2SB1243
Q 956 962		DTA143ZS
Q 958		2SD1859
Q 959		DTA143ZS
Q 964 970		2SB1238
Q 965		DTC114ES
Q 966		2SB772
Q 968		DTC114ES
Q 969		2SB1240
D 251 252 253		1SS270
D 501 502 551 555 558 559		1SS270
D 503		HZS3R0EB2
D 554		ERC04-02F
D 556 557		1SS270
D 561		HZS7R5JB3
D 601 602		MA700
D 603 604 701 703		1SS270
D 605		HZS6R8JB2
D 704		1SS270
D 709		1SS270
D 951		HZS6LB1
D 952		HZS6LB1
D 953 955 956		ERA15-02VH
D 954		HZS7LC2
D 957		HZS7LA1
L 701	Ferri-Inductor	LAU2R2M
L 702	Ferri-Inductor	LAU101K
L 951	Ferri-Inductor	LAU150K
L 952	Ferri-Inductor	CTF1202
L 953	Coil	CTF1135
IB 701		CWW1302
IB 702		CWW1240
IB 703		CWW1306
IB 951		CWW1301
IB 952		CWW1128
IB 953		CWW1292
IB 954		CWW1291
X 701	Crystal Resonator 45MHz	CSS1011
X 751	Ceramic Resonator	CSS1019
S 951	Switch	CSG1020
IL 904	Lamp 40mA 14V	CEL1268
VR 301 302	Semi-fixed 33kΩ(B)	VRTB6VS333
VR 451	200Ω,20kΩ(N),50kΩ(W),20kΩ(B)	CCS1200
VR 452	50kΩ(B)×4	CCS1199
EF 951		CCG1003

RESISTORS

R 251 252	RS1/10S104J
R 253 254	RS1/10S151J
R 255 256	RS1/10S133J
R 257 258	RS1/10S334J
R 259 260	RS1/10S272J
R 261 262	RS1/10S332J
R 263 264	RS1/10S104J
R 266	RS1/10S101J
R 267	RS1/8S222J
R 268	RS1/10S222J
R 269 270	RS1/10S682J
R 273 274	RS1/10S823J
R 301	RS1/10S103J
R 302	RS1/10S433J
R 303 304	RS1/10S273J
R 305	RS1/10S104J
R 401 402	RS1/10S822J
R 403	RS1/10S100J
R 404	RS1/10S684J
R 451 452 453 454	RD1/4PS153JL
R 455 456 457 458	RS1/10S332J
R 459 501 572 710 955 956 968	RS1/10S103J
R 460	RS1/8S123J
R 461 462 463 464 469 470 477 478	RS1/10S222J
R 465 466 529 566 569 570 994 995	RS1/8S0R0J
R 467	RS1/10S683J
R 468	RS1/8S683J
R 471 472 505 561	RS1/10S221J
R 473 474 525 573 615 967	RS1/10S102J
R 475	RD1/4PM472J

======Circuit Symbol & No.	Part Name======	Part No.
R 480 527 568 993		RS1/10S0R0J
R 502 506		RD1/4PS222JL
R 503		RD1/4PS223JL
R 504 971 972 973 974		RD1/4PS103JL
R 507		RD1/4PS392JL
R 508		RS1/10S823J
R 509 715		RD1/4PS473JL
R 510 975		RD1/4PS472JL
R 511 520 951		RS1/8S102J
R 512		RS1/8S222J
R 514 957 986		RS1/10S563J
R 515 617 706 708 965 966		RS1/10S473J
R 516		RS1/10S182J
R 517		RS1/10S101J
R 518		RS1/10S331J
R 519 953 960 989		RS1/8S472J
R 521		RS1/10S152J
R 522 526 607 608 609 610		RS1/10S222J
R 523		RS1/8S821J
R 524		RS1/8S101J
R 551 552		RD1/4PM102J
R 553 554		RS1/10S431J
R 555 556 557 558		RD1/4PS4R7JL
R 559		RD1/4PM223J
R 562		RS1/8S472J
R 563		RS1/10S223J
R 564		RD1/4PM222J
R 571 616 958 963 978 983 984 987		RS1/10S472J
R 601 602 603 604		RS1/10S473J
R 605 606		RS1/10S104J
R 611 612 613 614		RS1/10S113J
R 701 702 703 704		RS1/10S681J
R 707 856		RD1/4PS104JL
R 709 970		RS1/8S103J
R 714		RD1/4PS472JL
R 751		RS1/10S473J
R 752		RD1/4PS684JL
R 753		RS1/10S222J
R 754		RD1/4PS102JL
R 755 969		RS1/8S474J
R 756		RS1/10S474J
R 757		RS1/10S472J
R 758		RS1/10S0R0J
R 759		RS1/10S102J
R 851 852 853 854		RS1/10S102J
R 855		RS1/10S104J
R 857 858		RS1/10S822J
R 859 860		RS1/10S471J
R 861 862		RS1/10S223J
R 863		RS1/10S103J
R 864		RS1/10S123J
R 865		RS1/10S470J
R 952 981		RD1/2PS681JL
R 954 961		RS1/8S473J
R 959		RS1/10S104J
R 962		RD1/4PM473J
R 964		RD1/4PS220JL
R 976 977		RS1/10S1R0J
R 979		RD1/4PS122JL
R 980		RS1/8S472J
R 982		RD1/4PS122JL
R 985		RD1/4PS222JL
R 990		RS1/8S1R0J

CAPACITORS

======Circuit Symbol & No.	Part Name======	Part No.
C 251 252		CCSQCH471J50
C 253 254	2.2 μF/50V	CCH1145
C 255 256		CEA470M16LS
C 257 258		CKSQYB103K25
C 259 260		CKSQYB223K25
C 261 262		CEA4R7M35LS
C 263		CEA101M10LS
C 264		CEA100M16LS2
C 265		CEA100M16LS2
C 301 302		CEA010M50LS2
C 303 304		CEALNP100M16
C 305		CEA470M16LS
C 306 403		CEA101M10LS
C 307 308		CEAR68M50LS2
C 309		CKSYF104Z25
C 401		CKSQYB103K25
C 402		CCSQCH330J50
C 404		CEA0R1M50LS2
C 451 452 603 604		CCSQCH330J50
C 453 454		CKSQYB332K50
C 455 456		CKSQYB333K25
C 457 458 607 608		CEA4R7M35LS
C 459 460		CCSQCH330J50
C 461 462		CEAR33M50LS2
C 463 564 606 957		CEA100M16LS2
C 501		CASAQ100M10
C 502	0.047 μF	CCG1008
C 503 511		CKSQYB103K25
C 504 505 506 508		CKPYY103M16L
C 507		CKSYB473K25
C 509		CKSYB103K25
C 510		CCSQCH101J50
C 512		CKSQYB681K50
C 513		CCSCH101J50
C 514	4.7 μF/16V	CCH1005
C 515		CEAR47M50LS2
C 551 552		CEHAS3R3M50
C 553 554 757		CKSQYB102K50
C 555 556		CEHAS330M10
C 557 558 559 560		CFTNA224J50
C 561		CEA100M16LS2
C 563		CEA101M16LL
C 565		CEA101M10L2
C 566	4700 μF/16V	CCH1068
C 567		CEA100M16LS2
C 601 602		CEA010M50NPLL
C 605		CEA101M10LS
C 609		CKSQYB103K25
C 702		CASAQR7M10
C 703		CKPYB102K50L
C 704		CCSQCH100D50
C 705		CCSQCH090D50
C 708 953 961		CKSQYB473K25
C 709		CKSQYH104Z25
C 710		CKSQYB102K50
C 751 755		CEA470M10L2
C 752		CKSQYB103K25
C 753		CQMA683J50
C 754		CEAR33M50LS2
C 756		CEA4R7M35LS
C 758		CKSQYB332K50
C 851 852		CEA2R2M50LS2
C 853 854		CCSQCH101J50
C 855		CEAS22M10
C 856		CEA100M16LS2

======Circuit Symbol & No.	Part Name======	Part No.
C 857 858		CEA4R7M35LS
C 859		CKSQYB103K25
C 861 862		CEA330M16L2
C 951 952		CEA470M10L2
C 954		CEA221M16L2
C 955		CKSYF105Z25
C 956		CEA331M10L2
C 958	1000 μF/6.3V	CCH1112
C 959 960 963		CEA101M10LS
C 962		CEA470M16LS
C 964		CKSYB103K25

Unit Number :
Unit Name : Key Board Unit

MISCELLANEOUS

IC 901		S-80740AH-B4
IC 902		PD4285
IC 903		LC7582A
D 901 902 903 904 905		MA143-MC
L 901	Inductor	CTF1243
X 901	500kHz	CSS1069
IL 901 902 903	Lamp 40mA 14V	CEL1208
	LCD	CAW1168

RESISTORS

R 901 902 903 904 905		RS1/8S103J
R 906		RS1/10S104J
R 907		RS1/10S473J
R 908		RS1/10S103J
R 909 910 911 912 913 914 915 916 917		RS1/10S471J

CAPACITORS

C 902		CKSYF105Z25
C 903		CCSQCH331J50
C 904 905		CKSYB103K50
C 906 907		CCSQCH221J50
C 908 909 910 911 912		CKSYB152K50

Unit Number :
Unit Name : P.C.Board(A)

D 1		1SR-35-100A
S 2	Switch (FWD/REV)	ESH1003

Unit Number :
Unit Name : P.C.Board(B)

S 3	Switch (Tape/Tun)	ESN1011
S 4	Switch (MuteB)	ESH1004

Miscellaneous Parts List

S 1	Switch (MuteA)	ESN1005
HD 1	Head Assy	EXA1163
M 1	Motor Unit	EXA1264
SO 1	Solenoid	EXP1010

●The KEH-M4000SDK/WG,KEH-M4500/EW,KEH-M4500/IT,KEH-M4000/EW and KEH-M4000/IT Parts Lists enumerate the parts which differ from those enumerated in the KEH-M4500SDK/WG Parts List only.

The parts other than those enumerated in the former are indentical with those in the latter,to which you are requested to refer,accordingly.

The KEH-M4500SDK/WG Parts List is given on page 74.

FM/AM Tuner Unit

	KEH-M4500SDK/WG KEH-M4000SDK/WG	KEH-M4500/EW KEH-M4500/IT KEH-M4000/EW KEH-M4000/IT
No.	Part No.	Part No.
Q51	DTA114TK	·····
T51	CTE1021	CTC1065
T52	CTE1022	·····
R56	RS1/10S393J	RS1/10S822J
R57	RS1/10S562J	·····
R60	RS1/10S473J	·····
C58	CCSQCH060D50	CCSQCH150J50

Tuner Amp Unit

	KEH-M4500SDK/WG	KEH-M4000SDK/WG
No.	Part No.	Part No.
IC301	CXA1102P	·····
IC401	AN6263N	·····
Q251,252	2SC2458	·····
Q401	DTC114YS	·····
D704	1SS270	·····
VR301,302	VRTB6VS333	·····
R259,260	RS1/10S272J	·····
R261,262	RS1/10S332J	·····
R263,264,305	RS1/10S104J	·····
R269,270	RS1/10S682J	RS1/10S183J
R271,272	·····	RS1/10S0R0J
R301	RS1/10S103J	·····
R302	RS1/10S433J	·····
R303,304	RS1/10S273J	RS1/10S102J
R401,402	RS1/10S822J	·····
R403	RS1/10S100J	·····
R404	RS1/10S684J	·····
R714	RD1/4PS472JL	·····
C259,260	CKSQYB223K25	·····
C261,262	CEA4R7M35LS	·····
C265	CEA100M16LS2	·····
C301,302	CEA010M50LS2	·····
C303,304	CEALNP100M16	CEALNP4R7M16
C305	CEA470M16LS	·····
C306,403	CEA101M10LS	·····
C307,308	CEAR68M50LS2	·····
C309	CKSYF104Z25	·····
C401	CKSQYB103K25	·····
C402	CCSQCH330J50	·····
C404	CEA0R1M50LS2	·····
C754	CEAR33M50LS2	CEASR33M50

Tuner Amp Unit

	KEH-M4500SDK/WG	KEH-M4500/EW	KEH-M4500/IT
No.	Part No.	Part No.	Part No.
IC751	KHAC02	·····	·····
Q555	DTC114ES	·····	·····
Q751	2SC2458	·····	·····
Q752	2SD1920	·····	·····
Q753	DTC124ES	·····	·····
D709	1SS270	·····	·····
X751	CSS1019	·····	·····
IL904	CEL1268	CEL1268	CEL1267
R476	·····	RS1/10S0R0J	RS1/10S0R0J
R477,478	RS1/10S222J	RS1/10S0R0J	RS1/10S0R0J
R553,554	RS1/10S431J	RS1/10S471J	RS1/10S471J
R566	RS1/8S0R0J	·····	·····
R751	RS1/10S473J	·····	·····
R752	RD1/4PS684JL	·····	·····
R753	RS1/10S222J	·····	·····
R754	RD1/4PS102JL	·····	·····
R755	RS1/8S474J	·····	·····
R756	RS1/10S474J	·····	·····
R757	RS1/10S472J	·····	·····
R758	RS1/10S0R0J	·····	·····
R857,858	RS1/10S822J	RS1/10S682J	RS1/10S682J
C601,602	CEA010M50NPLL	CEA2R2M35NPLL	CEA2R2M35NPLL
C751,755	CEA470M10L2	·····	·····
C752	CKSQYB103K25	·····	·····
C753	CQMA683J50	·····	·····
C754	CEAR33M50LS2	·····	·····
C756	CEA4R7M35LS	·····	·····
C757	CKSQYB102K50	·····	·····
C758	CKSQYB332K50	·····	·····

Tuner Amp Unit

	KEH-M4500SDK/WG	KEH-M4000/EW	KEH-M4000/IT
No.	Part No.	Part No.	Part No.
IC301	CXA1102P	·····	·····
IC401	AN6263N	·····	·····
IC751	KHAC02	·····	·····
Q251,252,751	2SC2458	·····	·····
Q401	DTC114YS	·····	·····
Q555	DTC114ES	·····	·····
Q752	2SD1920	·····	·····
Q753	DTC124ES	·····	·····
D704,709	1SS270	·····	·····
X751	CSS1019	·····	·····
IL904	CEL1268	CEL1268	CEL1267
VR301,302	VRTB6VS333	·····	·····
R259,260	RS1/10S272J	·····	·····
R261,262	RS1/10S332J	·····	·····
R263,264,305	RS1/10S104J	·····	·····
R269,270	RS1/10S682J	RS1/10S183J	RS1/10S183J
R271,272,476	·····	RS1/10S0R0J	RS1/10S0R0J
R301	RS1/10S103J	·····	·····
R302	RS1/10S433J	·····	·····
R303,304	RS1/10S273J	RS1/10S102J	RS1/10S102J
R401,402	RS1/10S822J	·····	·····
R403	RS1/10S100J	·····	·····
R404	RS1/10S684J	·····	·····
R477,478	RS1/10S222J	RS1/10S0R0J	RS1/10S0R0J
R553,554	RS1/10S431J	RS1/10S471J	RS1/10S471J

	KEH-M4500SDK/WG	KEH-M4000/EW	KEH-M4000/IT
No.	Part No.	Part No.	Part No.
R566	RS1/8S0R0J	·····	·····
R714	RD1/4PS472JL	·····	·····
R751	RS1/10S473J	·····	·····
R752	RD1/4PS684JL	·····	·····
R753	RS1/10S222J	·····	·····
R754	RD1/4PS102JL	·····	·····
R755	S1/8S474J	·····	·····
R756	RS1/10S474J	·····	·····
R757	RS1/10S472J	·····	·····
R758	RS1/10S0R0J	·····	·····
R857,858	RS1/10S822J	RS1/10S682J	RS1/10S682J
C259,260	CKSQYB223K25	·····	·····
C261,262,756	CEA4R7M35LS	·····	·····
C265	CEA100M16LS2	·····	·····
C301,302	CEA010M50LS2	·····	·····
C303,304	CEALNP100M16	CEALNP4R7M16	CEALNP4R7M16
C305	CEA470M16LS	·····	·····
C306,403	CEA101M10LS	·····	·····
C307,308	CEAR68M50LS2	·····	·····
C309	CKSYF104Z25	·····	·····
C401,752	CKSQYB103K25	·····	·····
C402	CCSQCH330J50	·····	·····
C404	CEA0R1M50LS2	·····	·····
C601,602	CEA010M50NPLL	CEA2R2M35NPLL	CEA2R2M35NPLL
C751,755	CEA470M10L2	·····	·····
C753	CQMA683J50	·····	·····
C754	CEAR33M50LS2	·····	·····
C757	CKSQYB102K50	·····	·····
C758	CKSQYB332K50	·····	·····

Key Board Unit

	KEH-M4500SDK/WG KEH-M4000SDK/WG KEH-M4500/EW KEH-M4000/EW	KEH-M4500/IT KEH-M4000/IT
No.	Part No.	Part No.
IL901,902,903	CEL1208	CEL1228

P.C.Board(A)

	KEH-M4500SDK/WG KEH-M4500/EW KEH-M4500/IT	KEH-M4000SDK/WG KEH-M4000/EW KEH-M4000/IT
No.	Part No.	Part No.
D1	1SR-35-100A	·····

Miscellaneous Parts List

	KEH-M4500SDK/WG KEH-M4500/EW KEH-M4500/IT	KEH-M4000SDK/WG KEH-M4000/EW KEH-M4000/IT
No.	Part No.	Part No.
SO1	EXP1010	·····

25. CIRCUIT DESCRIPTION

• Indicating an Error Number

If the CD should fail to operate in multi mode, or if an error has taken place during the operation and resulted in an error, the player will enter into the error mode. And the cause of such error is numerically indicated.
This is aimed at assisting an analysis or a repair.

(1) Basic Means of Display

- With ERROR indicated in "MODE" on P-BUS Display date, an error code is transmitte by the use of MIN and SEC.
  Identical date are transmitted with MIN and SEC.
- Examples of Head Unit Display
  E-XX (4 digits)

(2) Error Codes

Error Code	Classification	Mode	Description	Detail/Cause
10	ELECTRIC	SET UP	Carriage home failure	Unmovable to and from the inner circumference → Home switch failed and/or carriage improper moved
11	↑	↑	Focus failure	Focussing failed → Disk scarred or stained on the back or vibrating hard
12	↑	↑	SET UP failure	Spindle failed to lock or subcode extraordinary → Spindle defective, disk other than audio and ROM
30	↑	SEARCH	Search time out	Target address failed to reach → Carriade/tracking improperly and/or disk scarred
A0	SYSTEM	—	Power failure	Power overvoltage or short circuit detected → Switching transistor defective and/or power abnormal
50			An error upon ejection	MAG SW release time has timeout.
60			An error while putting in and out the tray	Tray in/out time has timeout. Tray is caught when put in.
70			An error upon elevation	Elevation time has timeout.
80			An error with an empty magazine inserted	No disk is available.

* If TOC has failed to be read in, the operation will continue anyway.
  Error Code A0 is peculiar to the this unit and inapplicable to another future CD player.

- **New Test Mode (aging operation and setup analysis)**

The CD multiple plays in the normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, and disc number.
During the setup, the CD software operation status (internal RAM and C-point) is displayed.
The software on the head unit side does not involve any special problem but runs normally.
Since it is nesessary to cope with the error number display function.

(1) How to Put in the NEW TEST Mode
See the test mode flow chart page 14.
(2) Relations of keys between TEST and NEW TEST Modes.

P-BUS Commands	Keys	Test Mode Regulator OFF	Regulator ON	New Test Mode Play in progress	New Test Mode Error / Protection } Talking place
B0	BAND/REL	Regulator ON	Regulator OFF	BAND/REL	Time of occurrence / Cause of error } Selected
B1	TRACK +	—	FWD-KICK	TRACK +	—
B2	TRACK −	—	REV-KICK	TRACK −	—
B3	SCAN	—	TRACKING CLOSE	SCAN	—
B4	RPT/RDM	—	TRACKING OPEN	RPT/RDM	—
B5	ITP	—	FOCUS CLOSE	ITP	—
B6	—	—	FOCUS OPEN	—	—
B7	—	—	Jump-OFF	—	—
B8	TRACK+/−	To new Test Mode	Jump-Mode selected	TRACK+/−	Occurrence TNo / Time of occurrence } Selected

Operations, such as EJECT, CD ON/OFF, etc. are to be performed normally

(3) Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause/Detail
40	ELECTRIC	PLAY	FOK — L 100 ms	Put out of focus
41	↑	↑	LOCK — L 100 ms	Spindle unlocked
42	↑	↑	Subcode unacceptable 500 ms	Subcode failes to read
43	↑	↑	Sound skipped	Last address memory operated

Scar, Stain, Vibration, Servo defect, etc...

* The error code is identical with those in the normal mode.

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving on the internal circumference	10-second time out
03	Carriage moving on the external circumference	10-second time out
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closing	Failure to focus closing
14	Spindle kicked and focus checked	Out of focus
15	Tracking closed and focus checked	Out of focus
17	Carriage closed and focus checked	Out of focus
18	Lock, subcode } Waiting	Failure to lock, Subcode failed to read out of focus
19	End	None

(5) Example of 7-segment Display

(a) SET UP in progress

TRACK 11 MIN 11 SEC 11

TRACK 11 MIN 11 SEC 11

While in the TEST MODE, a status number is indicated in TNO, MIN and SEC.

(b) Operation (PLAY, SEARCH, etc.) in progress Perfectly identical with that in the multi mode.

(c) Protection/Error upon occurrence

E-XX

While in the error mode, an error number is displayed in MIN and SEC.

Select the display with the BAND/REL key.

TRACK 10 MIN 40 SEC 05

TRACK 10 MIN 40 SEC 05

Select the display with the TRACK +/− key.

While in the PLAY MODE, an adsolute time is indicated in TNO, MIN and SEC.

PIONEER
The Art of Entertainment

Service Manual

ORDER NO.
CRT1328

CASSETTE MECHANISM ASSEMBLY

CX-197

NOTE

- **This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for the model under repair.**

Model	Service Manual	Cassette Mechanism Assembly
KE-1700B/IT KE-1700SDK/WG KE-1730B/EW KE-2700B/IT KE-2700SDK/WG KE-2730B/EW	CRT1325	EXK1710
KE-1700QR/UC KE-2303QR/UC KE-2750QR/ES	CRT1327	EXK1710
KE-2033/UC KE-2033/XSG/UC KE-2828/XSG/UC KE-2828/ES. UC	CRT1331	EXK1710
KE-3838/UC. ES KE-3838/XSG/UC KE-3838/XML/UC	CRT1332	EXK1710
KE-1700B/XML/IT	CRT1336	EXK1710
KE-1730B/XIB KE-1730B/XML/EW KE-1730B/XSG/EW	CRT1337	EXK1710
KE-2630B/XIB KE-2730B/XIB	CRT1340	EXK1710

Model	Service Manual	Cassette Mechanism Assembly
KE-1700QR/XML/UC	CRT1339	EXK1710
KE-3700SDK/WG KE-3730B/EW KE-3700B/IT	CRT1326	EXK1720
KE-2700QR/UC KE-3700QR/UC KE-3750QR/ES	CRT1327	EXK1720
KE-4848/ES. UC KE-4848/XML/UC KE-4848/XSG/UC	CRT1330	EXK1720
KE-250/US KE-3033/UC KE-3033/XSG/UC	CRT1332	EXK1720
KE-3730B/XIB	CRT1338	EXK1720
KE-450QR/US	CRT1327	EXK1750
KE-350/US	CRT1330	EXK1750

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: (03) 580-9911
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FT JAN. 1991 Printed in Japan

1. DISASSEMBLY

Note: Always use new washer and E washer at the time of reassembling.

● How to Remove the Belt and Motor

1. Remove screw A fixing the FR lever. (Fig.1)
2. Remove three screws B fixing the sub-chassis unit. Move the unit first in Direction A, then in B direction, and lift it upward for removal. (Fig.2)
3. The belt can now be removed. (Fig.3)
4. Remove two screws C. The motor can be removed. (Fig.3)

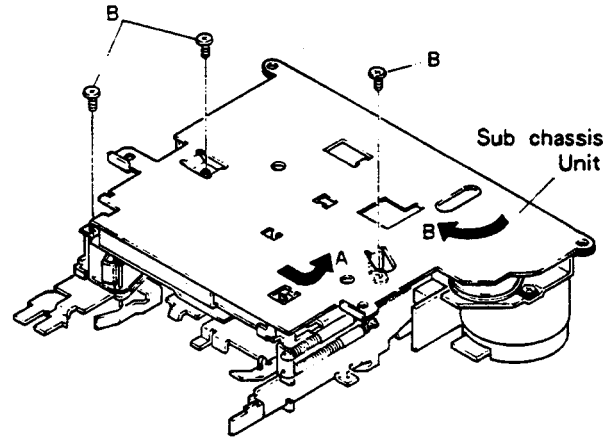

Fig. 2

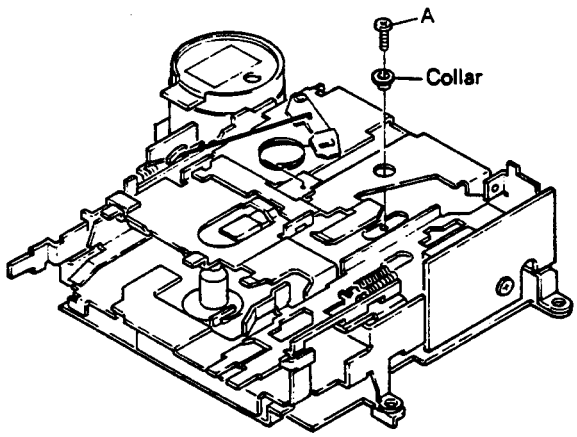

Fig. 1

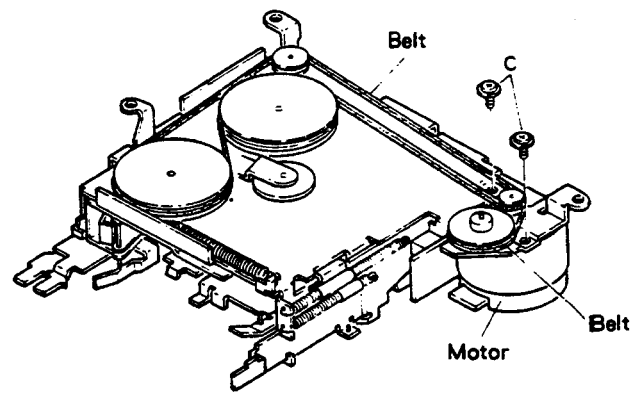

Fig. 3

● How to Remove the Pinch Roller Unit and Head

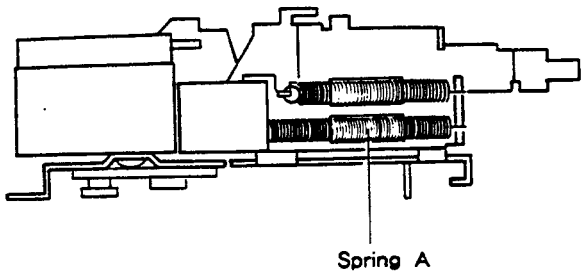

Fig. 4

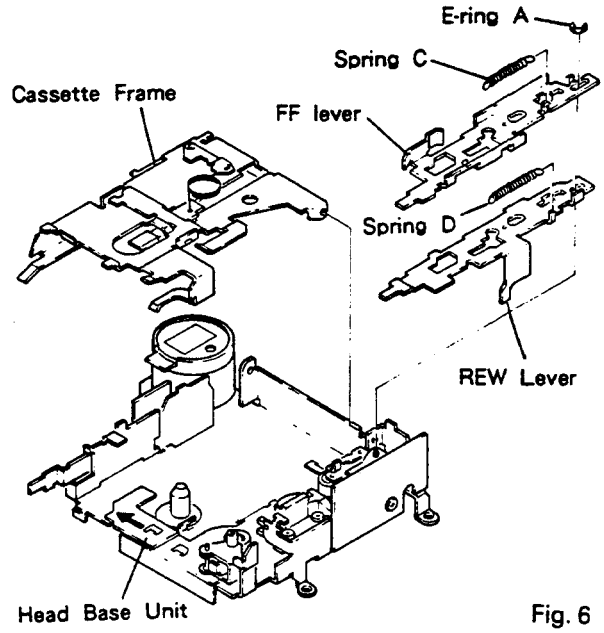

Fig. 6

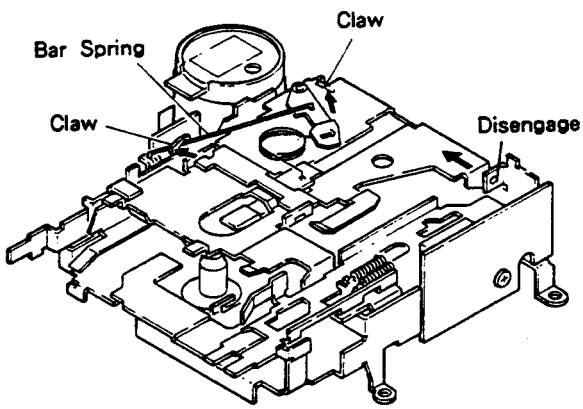

Fig. 5

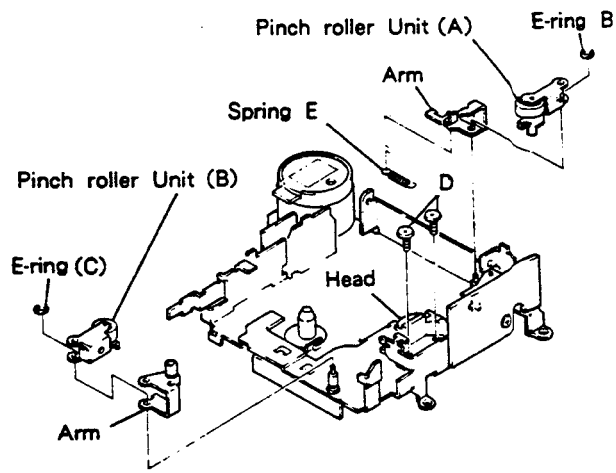

Fig. 7

1. Remove spring A. (Fig.4)
2. Extend claws (2 points). (Fig.5)
3. Remove bar Spring. (Fig.5)
4. Disengage projection by moving in a direction of arrow mark. (Fig.5)
5. The cassette frame is removed. (Fig.6)
6. Remove springs C and D. (Fig.6)
7. Remove E-ring A. (Fig.6)
8. Remove FF/REW levers. (Fig.6)
9. Move head base unit forward. (Fig.6)
10. Remove spring E. (Fig.7)
11. Remove E-ring B. The pinch roller unit (A) can be removed. (Fig.7)
12. Remove E-ring C. The pinch roller unit (B) can be removed. (Fig.7)
13. Remove two screws D. The head can be removed. (Fig.7)

2. ADJUSTMENT

2.1 CHECK POINTS OF CASSETTE MECHANISM

Confirm the following items when replacing parts of the cassette mechanism.	■ Tape speed deviation: $3{,}000\ ^{+90}_{-30}$Hz (4.76cm/s $^{+3}_{-1}$ %) Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimun and maximum values. Measuring time shall be 5 — 6 seconds.	■ Wow and flutter: Less than 0.2% (WRMS) Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.
■ Fast forward and rewinding time: 100 — 120 seconds Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.	■ Winding torque: 35 — 65g • cm Using a cassette type torque meter (100 g•cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 — 6 seconds.	■ F.F. torque: 70 — 120g • cm Using a cassette type torque meter (120 g•cm), measure the value when the tape stops in the F.F. mode.
■ REW torque: 70 — 120g • cm Using a cassette type torque meter (120 g•cm), measure the value when the tape stops in the REW mode.	■ Back tension torque: 2 — 6g • cm After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.	■ Cassette loading force: Less than 0.7 kg Push the center of the cassette and measure the force with a tension meter (3 kg).

2.2 AZIMUTH ADJUSTMENT

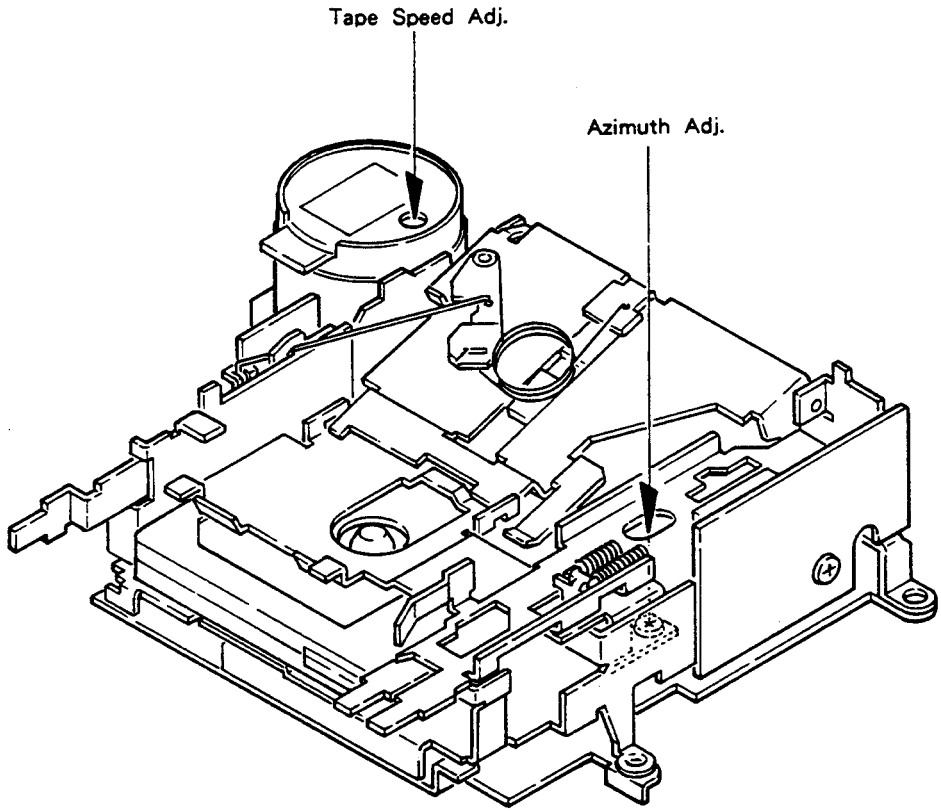

Fig. 8

● To Adjust (EXK1750)

1. Play "A" side of NCT-110 (10kHz, – 10dB). Adjust the screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

2.3 TAPE SPEED ADJUSTMENT

1. Reproduce NCT-111 (3kHz, – 10dB). Adjust the semifixed resistor so that frequency counter shows 3010Hz (+80Hz, – 40Hz).

3. MECHANISM DESCRIPTION

● Loading operation

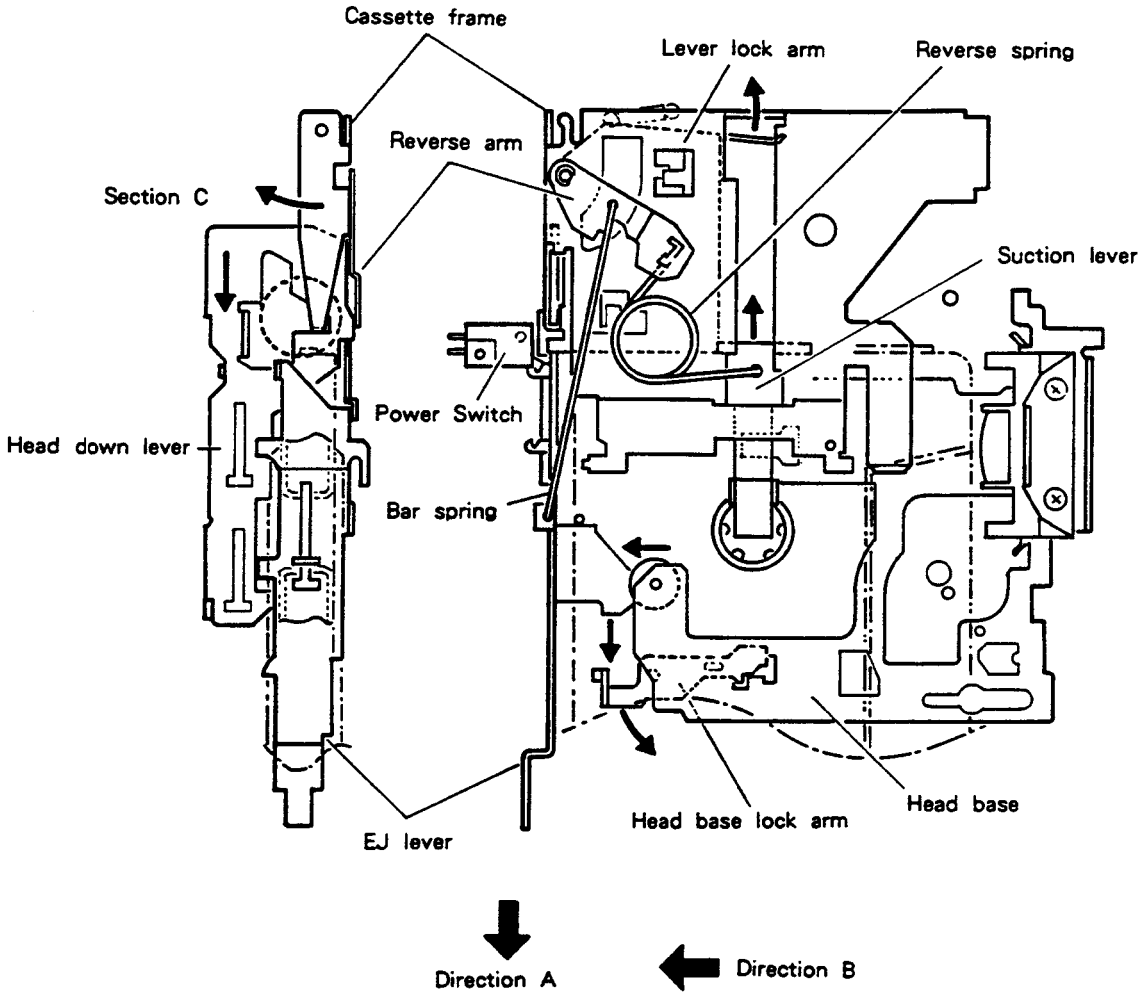

Fig. 9

1. A cassette tape, when inserted, pushes a suction lever.
   The reverse spring rotates to move past the reverse point. Then, the cassette is drawn by a force of a reverse spring (suction operation).
2. After suction, the lever lock arm is pressed to be unlocked.
3. The head down lever is unlocked and the lever moves in Direction A.
4. While moving, the EJ lever turns ON the power switch.
5. The cassette frame engaged to the section C of the head down lever turns. (Cassette drop operation)
6. At the stroke end, the head down lever turns the head base lock arm.
7. A Stopper of the head base lock arm is released, and the head base moves forward (Direction B).

● MS Operation (EXK1720, EXK1750)

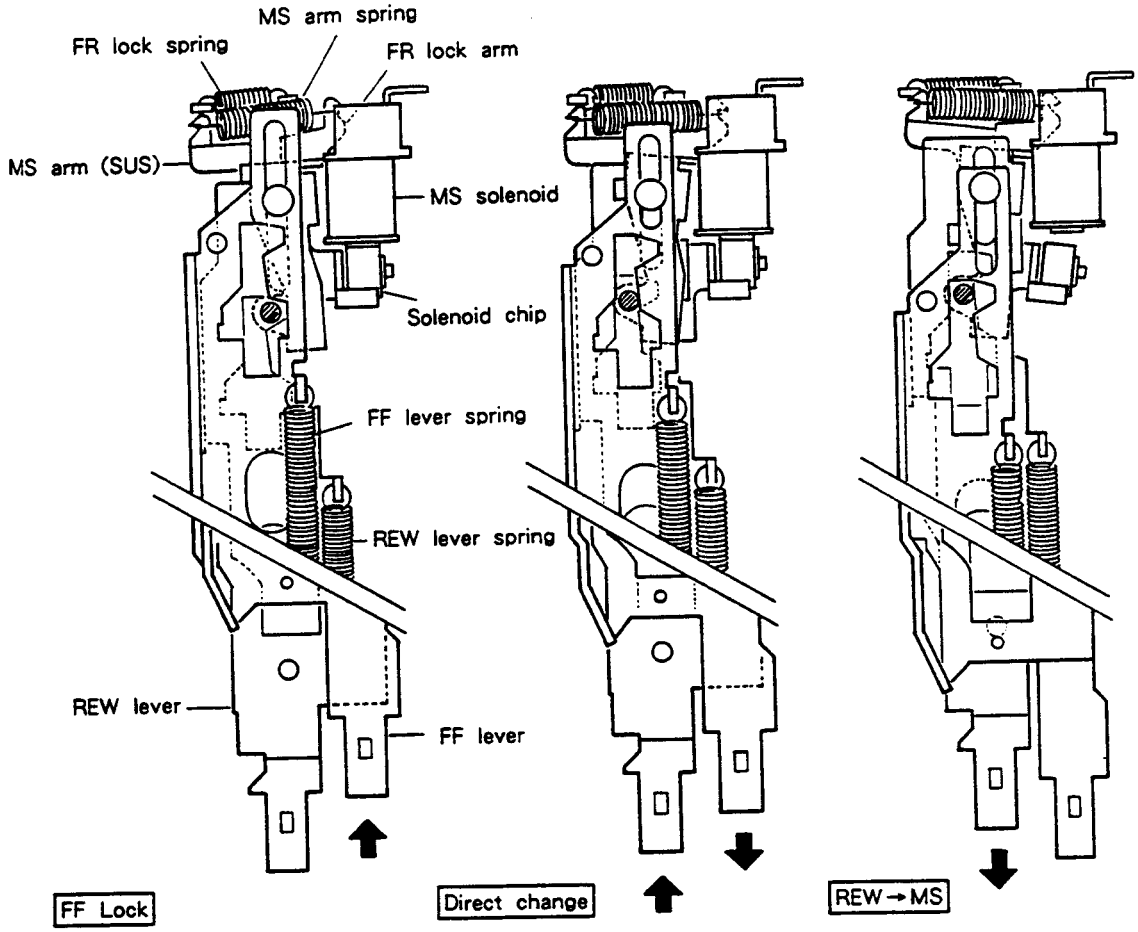

Fig. 10

Fig. 11

Fig. 12

1. The MS solenoid is normally energized to attract the solenoid chip during play and F/R operation. The solenoid chip applies counterclockwise force to the MS arm, thereby putting the FR lock arm into rotation via the MS arm spring. The MS lock shaft of FR lock arm unit catches a taper in a different hole of the FF (or REW) lever to lock the FF (or REW) lever.
2. In case of direct change, pressing the unlocked FF or REW lever causes the lever taper to turn the FR lock arm clockwise. This in turn presses the MS arm spring and FR lock spring to release the locked lever.
3. When the no recording section is caught and the power supply to the solenoid is cut off, the solenoid loses the attraction force and disables locking of the F/R lever. As a result, the F/R lever is unlocked. (This unlocking occurs because the force to retain the lever cannot be generated by the FR lock spring only.)

● Direction Changeover Operation

(1) FWD play operation

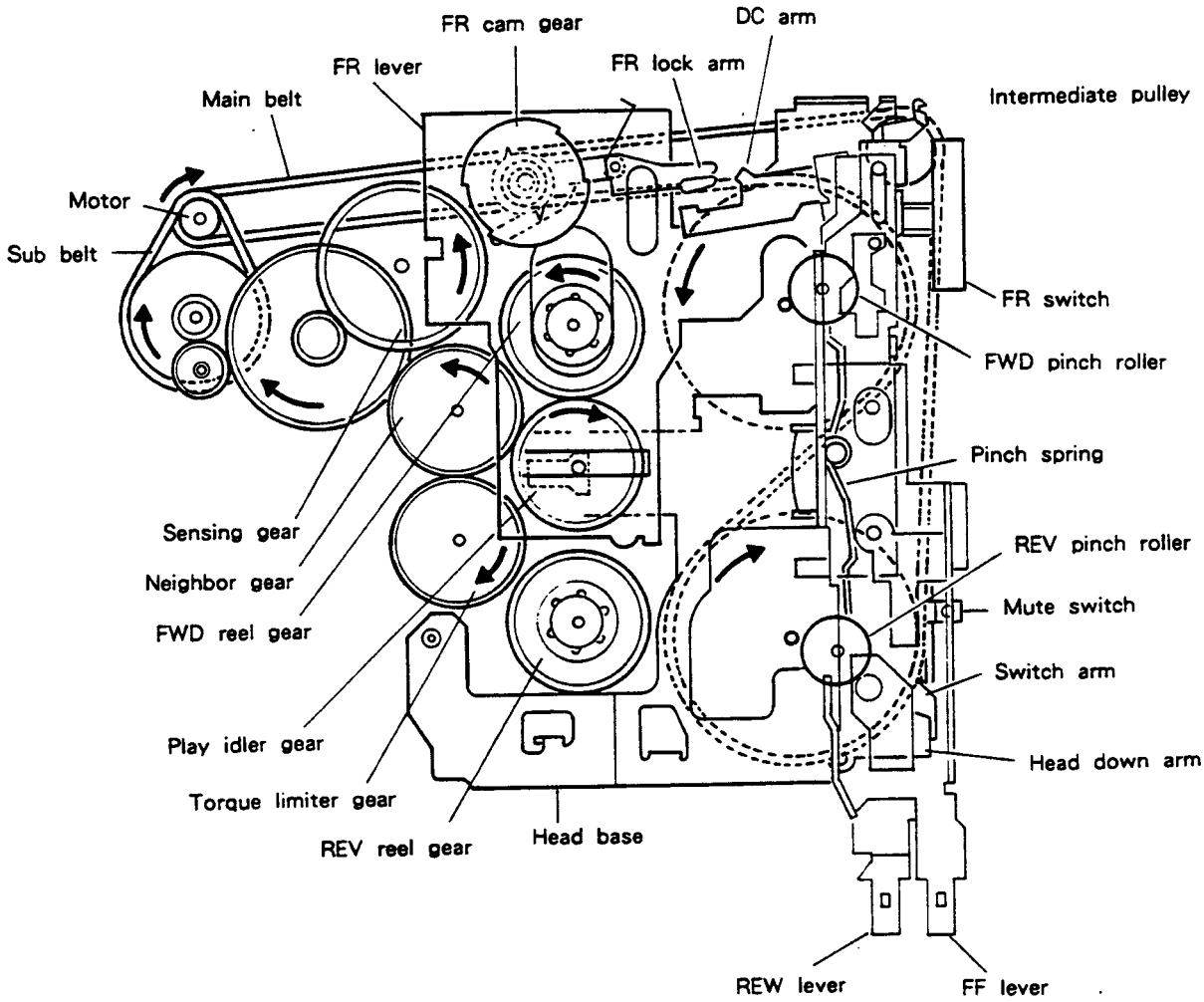

Fig. 13

When the FR lever is in the top position, the pinch spring is in the upper position to press the FWD pinch roller. The FR switch also moves upward and its reaction causes downward force on the FR lever. The spring attached to the FR lever applies upward force to the play idler gear from above to engage it with the neighbor gear and FWD reel gear.

The tape is driven in the FWD direction by a running motor and taken up by the REV reel gear via the torque limiter gear.

(2) Direction change operation

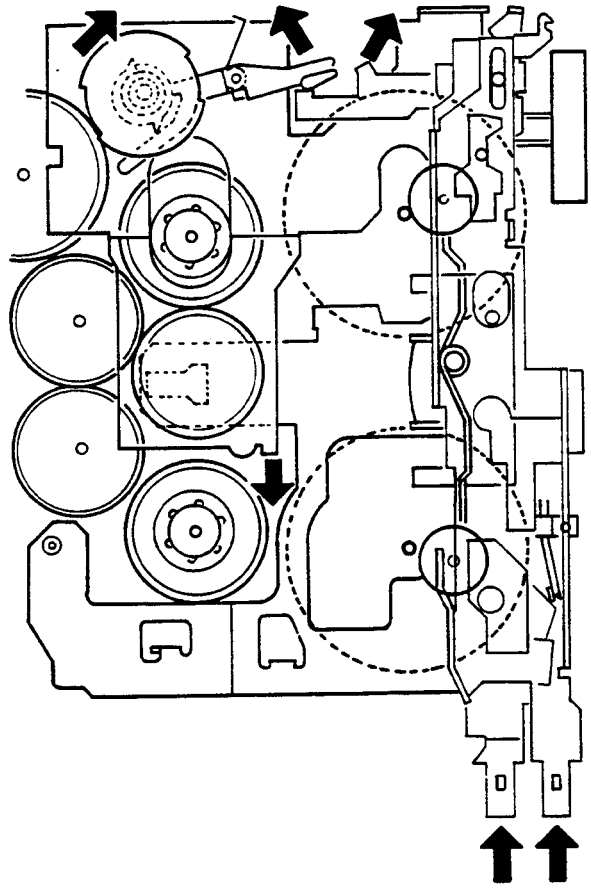

Fig. 14

The direction is changed by pressing FF and REW levers simultaneously. The DC arm turns along a cam groove of FF and REW levers to turn the FR lock arm. As the FR lever applies force from above downward, the FR cam gear turns and the notch meshes with the sensing gear.
As a result, the FR lever moves downward.
When FF and REW levers are kept pressed, the lock arm contacts the outside of the FR cam gear to prevent changeover between FWD and REV. Pressing FF and REW levers also cause the mute switch to be turned ON. In other words, muting is valid while FF and REW levers are pressed. (Fig.14)

(3) REV play operation

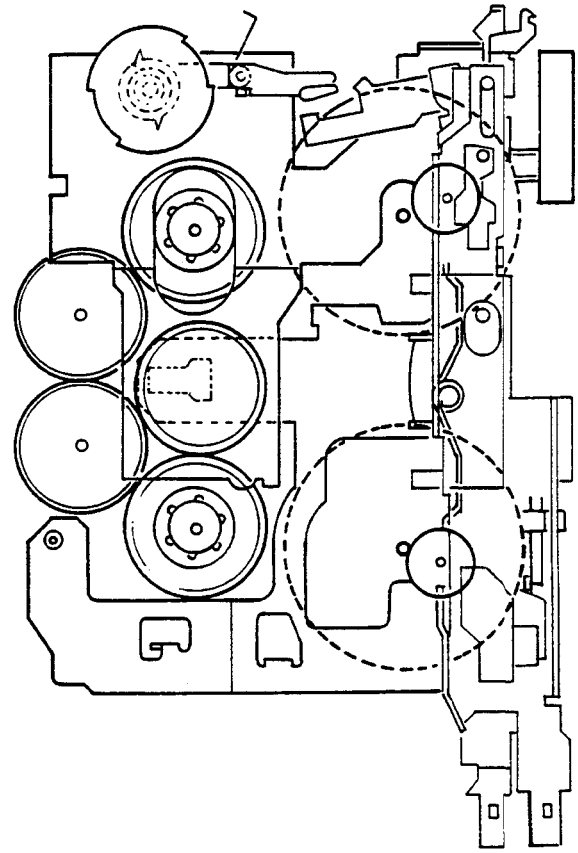

Fig. 15

Moving the NR lever up and down causes changeover among the pinch roller, FR switch, and play idler gear. With FF and REW levers having been returned, the FR lock arm returns to the normal lock position and locks the gear when the FR gear completes an one-half turn. The mute arm also returns to turn OFF the mute switch. The reverse play state is thus obtained. (The same applies to changeover from REV to FWD.)

● FF/REW Operation

(1) FWD play operation

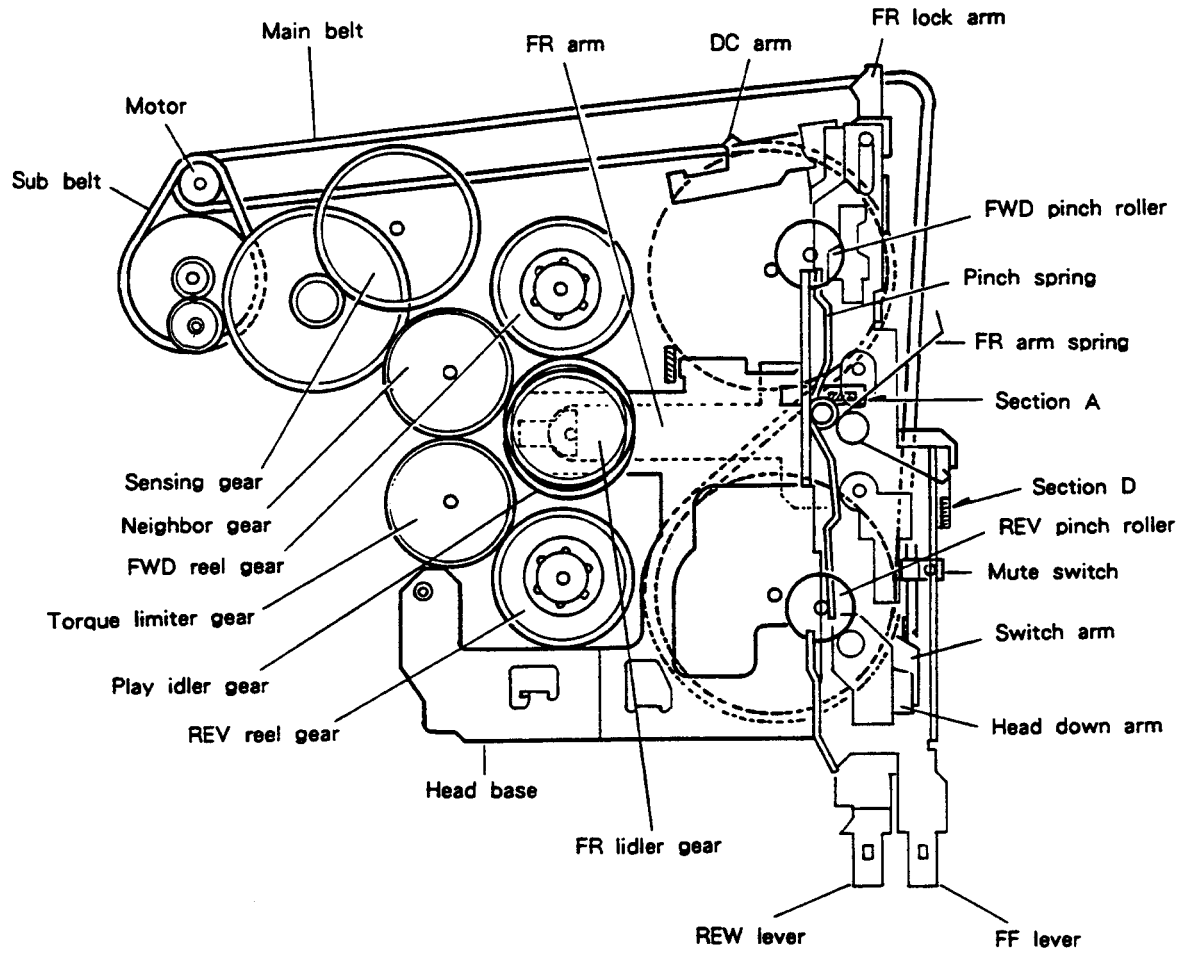

Fig. 16

In the FWD (REV) play state, the head base is fixed by a chassis stopper. The pinch spring presses the pinch roller into contact with a capstan to drive forward the tape. The REV reel gear takes up the tape via the torque limiter gear. In this case, the FR idler gear on the FR arm is centered by Section A of the head base and thus not rotating.

(2) FF Operation

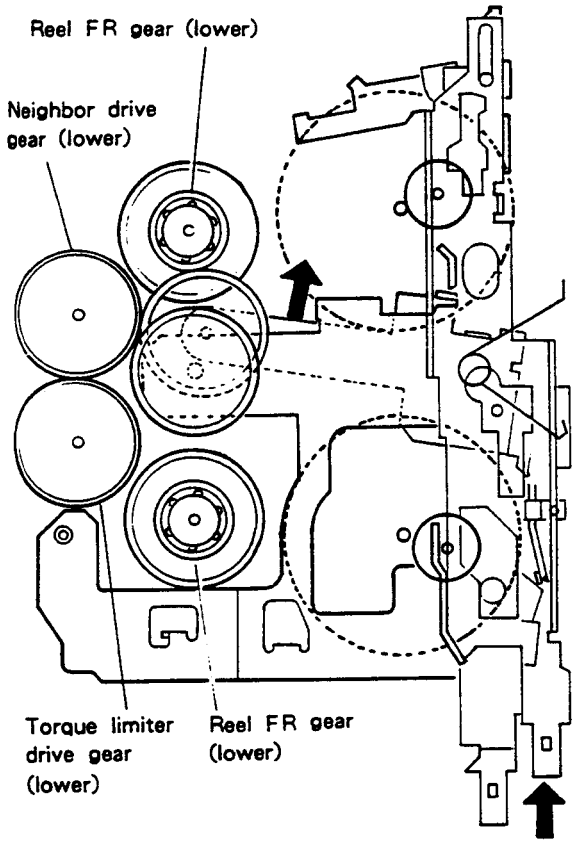

Fig. 17

FF operation is obtained by pressing and locking the FF lever. As the FF lever is pressed, the switch arm turns to turn ON the mute switch. The head base is moved backward along the FF lever cam groove.

As the head base moves backward to release the pinch roller from the capstan, the play idler gear is simultaneously disengaged from the reel gear. As the head base moves backward, the FR arm centered by Section A is put into rotation by the FR arm spring to engage with the FWD side FR gear.

The FF lever is locked by the FR lock arm and performs the FF operation. (Fig.17)

(3) REW operation

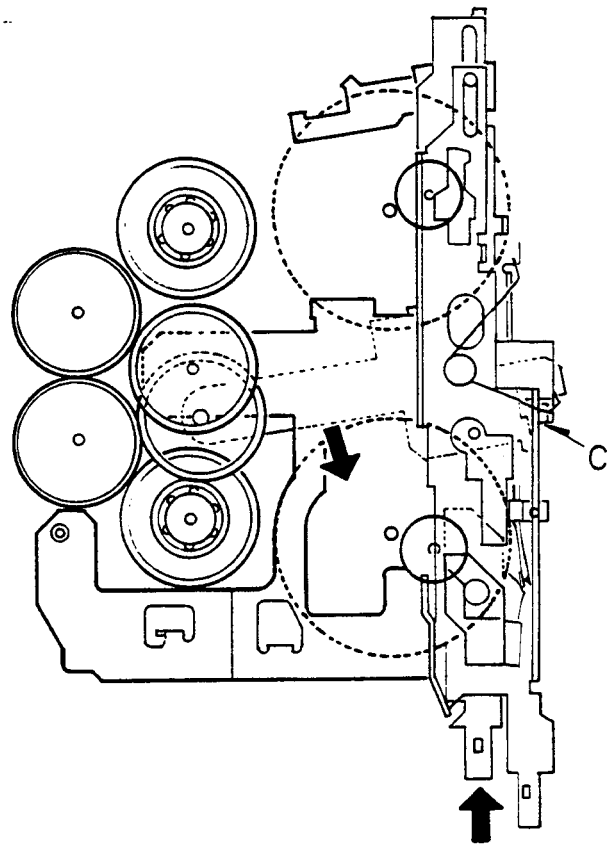

Fig. 18

Similar to the case of FF operation, pressing the REW lever causes the mute switch to be turned ON.

Simultaneously with release of the pinch roller from the capstan, the play idler gear is disengaged from the reel gear.

Section D of the REW lever presses a movable side of the FR arm spring, thereby engaging the FR gear to the FR gear on the REV side.

The REW lever is locked by the lock arm, performing the REW operation. This operation is cancelled when Section C is turned by the lever return spring. (Fig.18)

● Sensing Operation

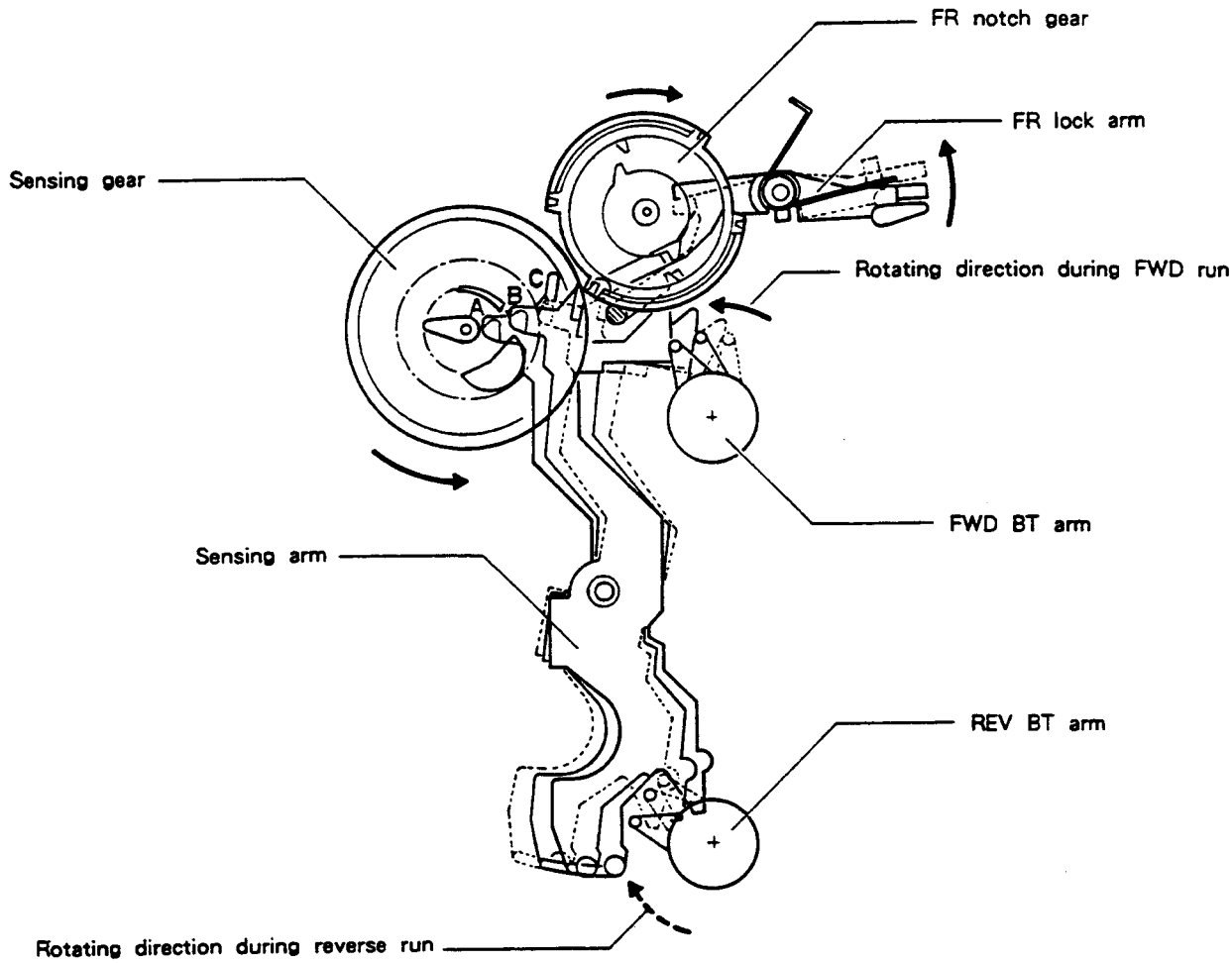

Fig. 19

1. During tape run: The sensing arm keeps oscillation between A and B under a force of the FWD BT arm (or REV BT arm).

2. At end of tape: The force of the BT arm is lost. The sensing arm stops at Position B, then pushed out to Position C by a crescent cam of the sensing gear.

3. Change of run direction:
The FR lock arm turns counter-clockwise along with movement of the sensing arm. The FR notch gear is unlocked and begins to turn.

ADDITIONAL

Service Manual

PIONEER
The Art of Entertainment

ORDER NO.
CRT1428

CASSETTE MECHANISM ASSEMBLY

CX-197

NOTE

- **This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for the model under repair.**
- **CX197 (CRT1328) does not have a Key-off function, but the key-off function is shown in this service manual of the CX-197 (CRT1428).**

Model	Service Manual	Cassette Mechanism Assembly
KEH-M7400RDS/EW	CRT1429	EXK1735

Model	Service Manual	Cassette Mechanism Assembly

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911
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FU DEC. 1991 Printed in Japan

1. DISASSEMBLY

Note: Always use new washer and E washer at the time of reassembling.

● How to Remove the Belt and Motor

1. Remove screw A fixing the FR lever. (Fig.1)
2. Remove three screws B fixing the sub-chassis unit. Move the unit first in Direction A, then in B direction, and lift it upward for removal. (Fig.2)
3. The belt can now be removed. (Fig.3)
4. Remove two screws C. The motor can be removed. (Fig.3)

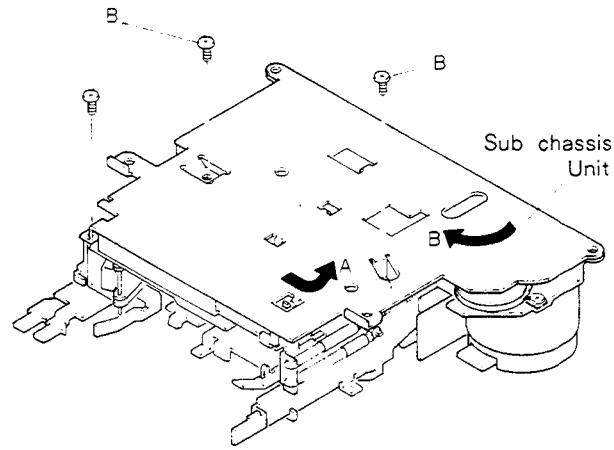


Fig. 2

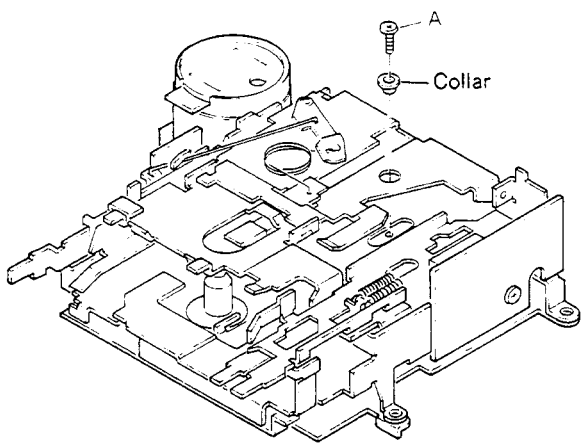


Fig. 1

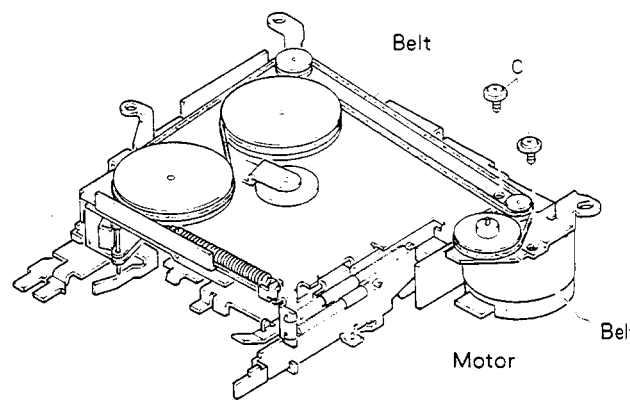


Fig. 3

● How to Remove the Pinch Roller Unit and Head

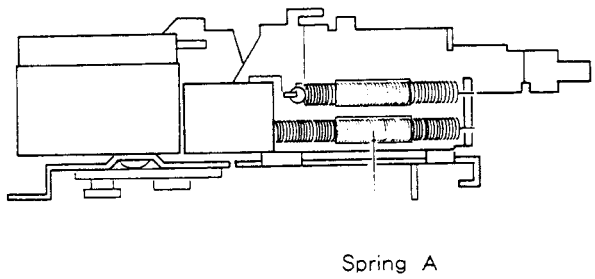


Fig. 4

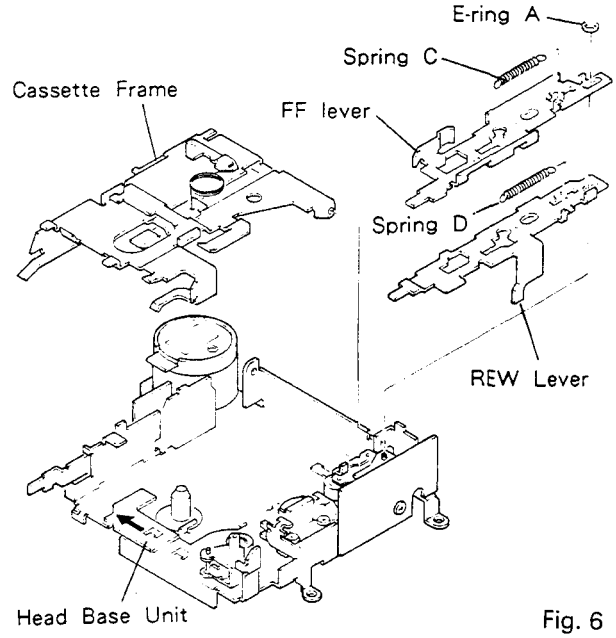


Fig. 6

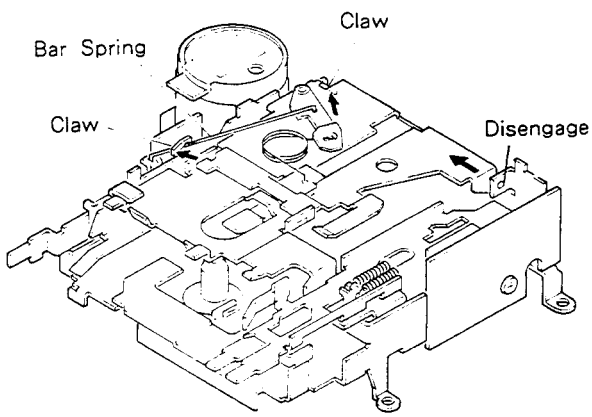


Fig. 5

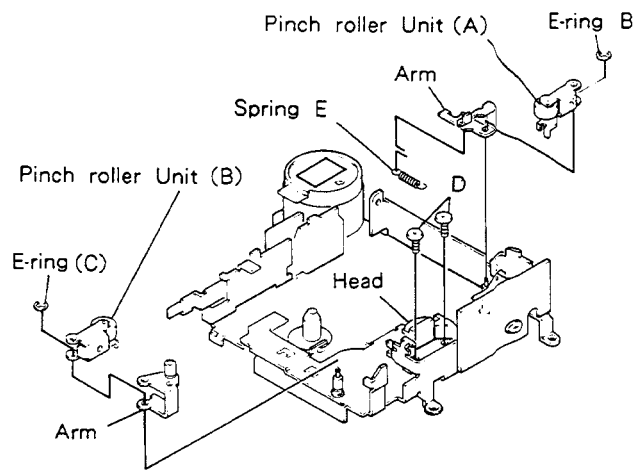


Fig. 7

1. Remove spring A. (Fig.4)
2. Extend claws (2 points). (Fig.5)
3. Remove bar Spring. (Fig.5)
4. Disengage projection by moving in a direction of arrow mark. (Fig.5)
5. The cassette frame is removed. (Fig.6)
6. Remove springs C and D. (Fig.6)
7. Remove E-ring A. (Fig.6)
8. Remove FF/REW levers. (Fig.6)
9. Move head base unit forward. (Fig.6)
10. Remove spring E. (Fig.7)
11. Remove E-ring B. The pinch roller unit (A) can be removed. (Fig.7)
12. Remove E-ring C. The pinch roller unit (B) can be removed. (Fig.7)
13. Remove two screws D. The head can be removed. (Fig.7)

2. ADJUSTMENT

2.1 CHECK POINTS OF CASSETTE MECHANISM

Confirm the following items when replacing parts of the cassette mechanism.	■ Tape speed deviation: 3,000 $^{+90}_{-30}$ Hz (4.76cm/s $^{+3}_{-1}$ %) Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimun and maximum values. Measuring time shall be 5 — 6 seconds.	■ Wow and flutter: Less than 0.2% (WRMS) Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 — 6 seconds.
■ Fast forward and rewinding time: 100 — 120 seconds Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.	■ Winding torque: 35 — 65g • cm Using a cassette type torque meter (100 g•cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 — 6 seconds.	■ F.F. torque: 70 — 120g • cm Using a cassette type torque meter (120 g•cm), measure the value when the tape stops in the F.F. mode.
■ REW torque: 70 — 120g • cm Using a cassette type torque meter (120 g•cm), measure the value when the tape stops in the REW mode.	■ Back tension torque: 2 — 6g • cm After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.	■ Cassette loading force: Less than 0.7 kg Push the center of the cassette and measure the force with a tension meter (3 kg).

2.2 AZIMUTH ADJUSTMENT

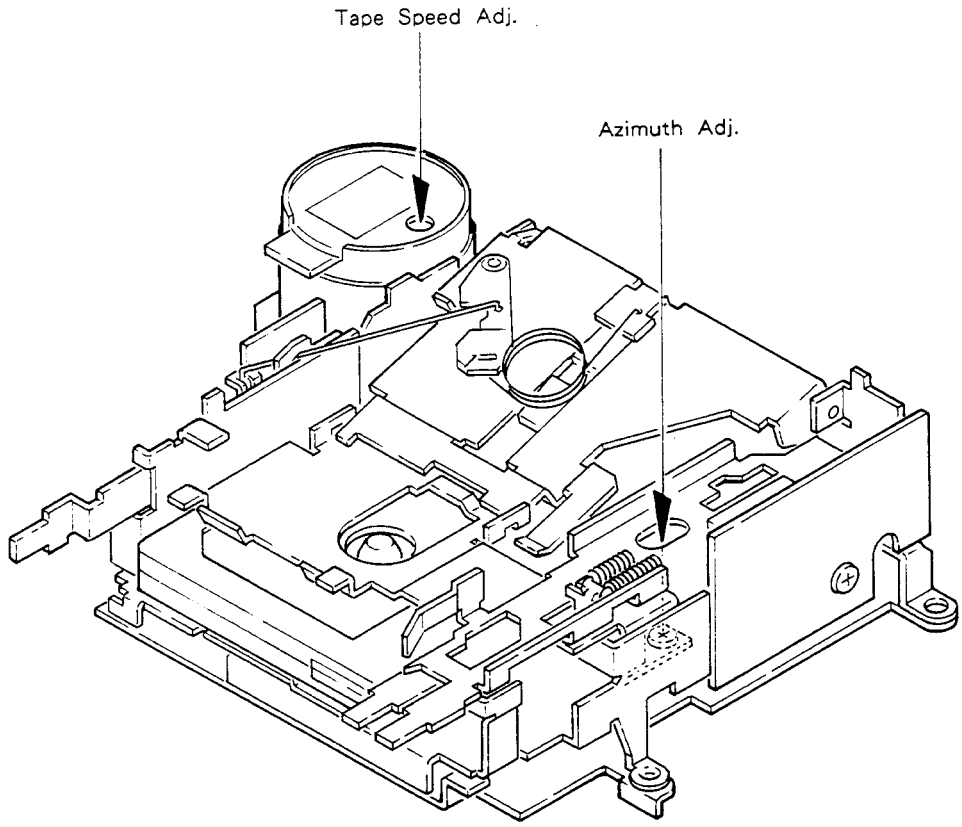


Fig. 8

● To Adjust (EXK1750)

1. Play "A" side of NCT-110 (10kHz, – 10dB). Adjust the screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

2.3 TAPE SPEED ADJUSTMENT

1. Reproduce NCT-111 (3kHz, – 10dB). Adjust the semifixed resistor so that frequency counter shows 3010Hz (+80Hz, – 40Hz).

3. MECHANISM DESCRIPTION

● Loading operation

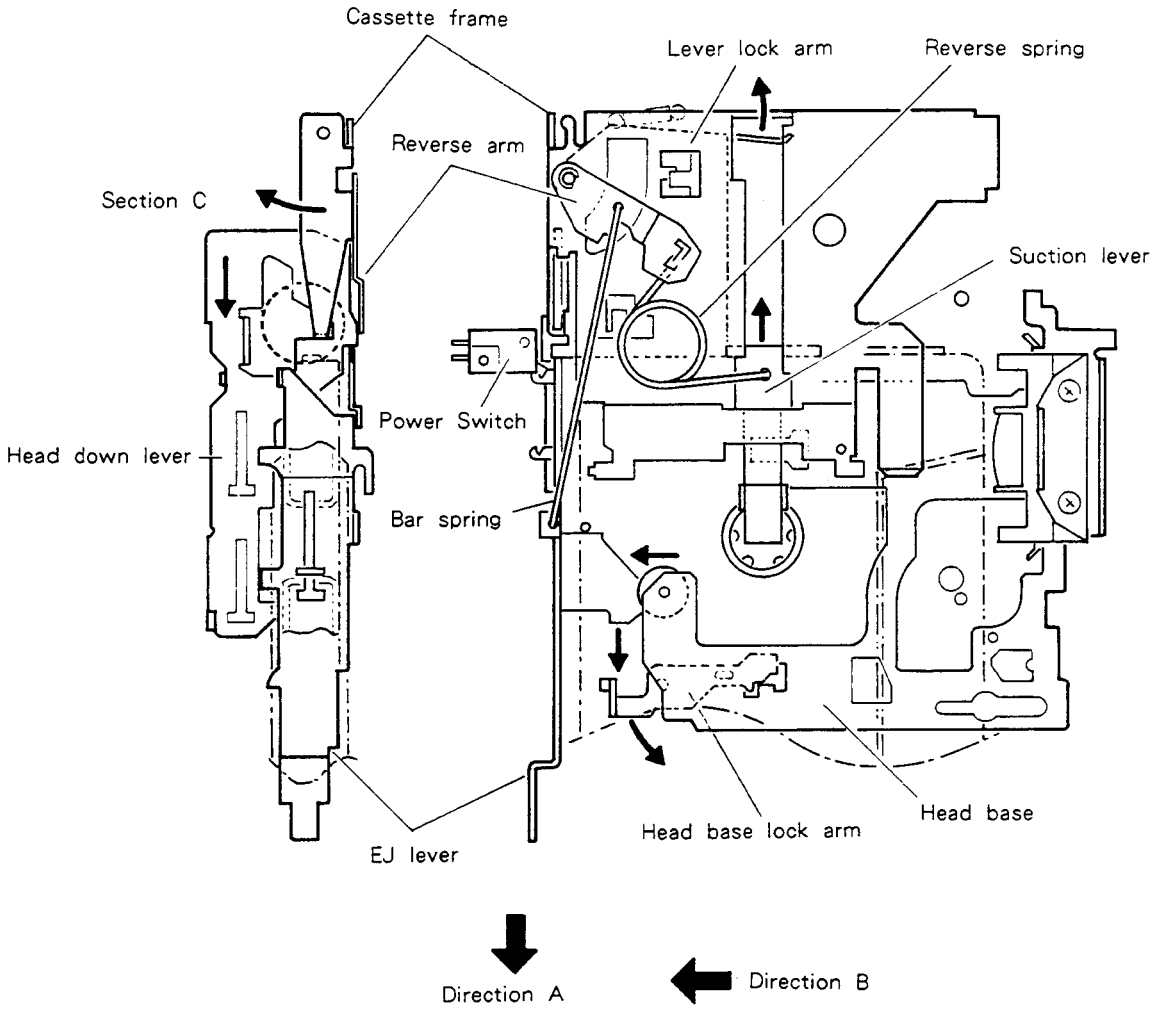


Fig.9

1. A cassette tape, when inserted, pushes a suction lever.
   The reverse spring rotates to move past the reverse point. Then, the cassette is drawn by a force of a reverse spring (suction operation).
2. After suction, the lever lock arm is pressed to be unlocked.
3. The head down lever is unlocked and the lever moves in Direction A.
4. While moving, the EJ lever turns ON the power switch.
5. The cassette frame engaged to the section C of the head down lever turns. (Cassette drop operation)
6. At the stroke end, the head down lever turns the head base lock arm.
7. A Stopper of the head base lock arm is released, and the head base moves forward (Direction B).

● MS Operation

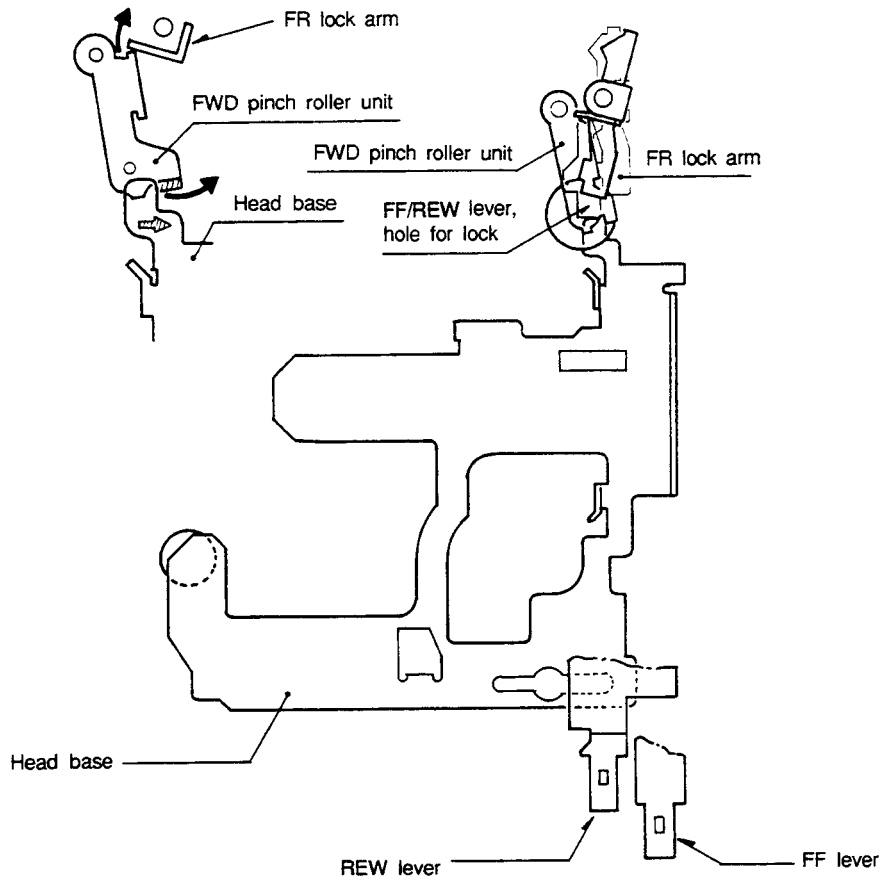


Fig. 10

The head base is moved back by switching the key-off solenoid off from the REW or FF condition, and is lowered (rotated) FWD pinch roller unit. The FWD pinch roller unit presses the bending part of FR lock arm to make it rotate in the direction that releases the lock. The lock of the FF/REW lever is consequently released.
Subsequently, the head comes out from the ATSC to enable PLAY condition.

● Direction Changeover Operation

(1) FWD play operation

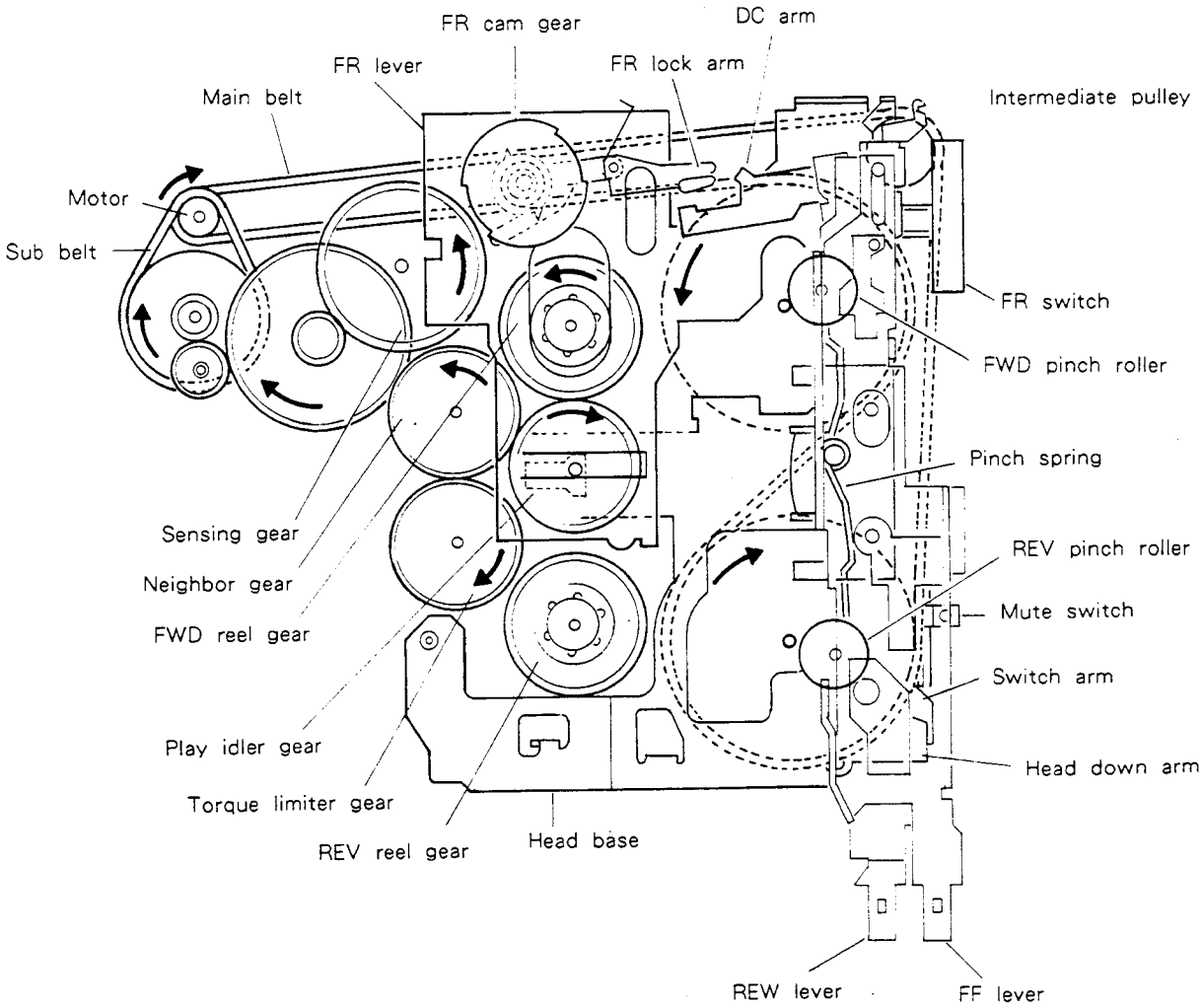


Fig. 11

When the FR lever is in the top position, the pinch spring is in the upper position to press the FWD pinch roller. The FR switch also moves upward and its reaction causes downward force on the FR lever. The spring attached to the FR lever applies upward force to the play idler gear from above to engage it with the neighbor gear and FWD reel gear.

The tape is driven in the FWD direction by a running motor and taken up by the REV reel gear via the torque limiter gear.

(2) Direction change operation

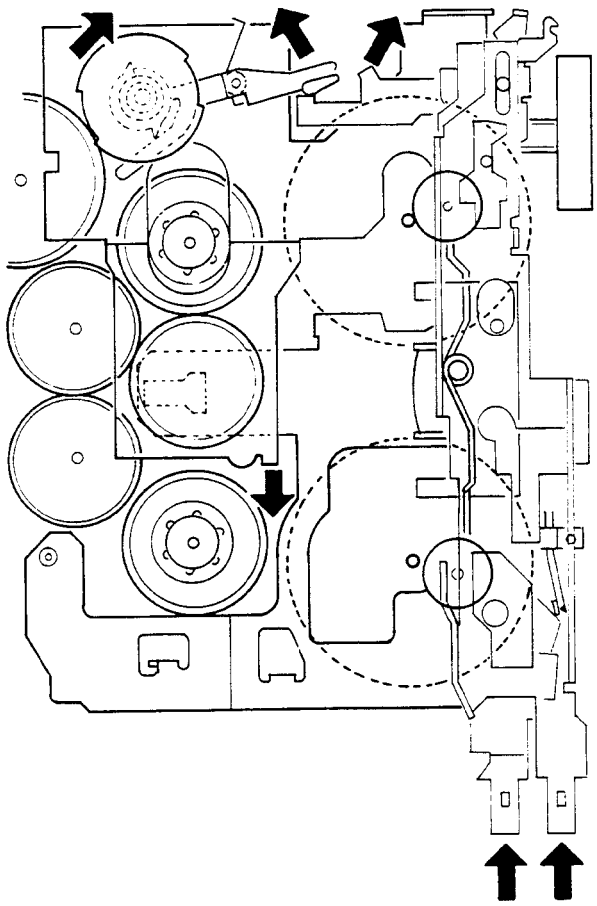


Fig. 12

The direction is changed by pressing FF and REW levers simultaneously. The DC arm turns along a cam groove of FF and REW levers to turn the FR lock arm. As the FR lever applies force from above downward, the FR cam gear turns and the notch meshes with the sensing gear.

As a result, the FR lever moves downward.

When FF and REW levers are kept pressed, the lock arm contacts the outside of the FR cam gear to prevent changeover between FWD and REV. Pressing FF and REW levers also cause the mute switch to be turned ON. In other words, muting is valid while FF and REW levers are pressed. (Fig.12)

(3) REV play operation

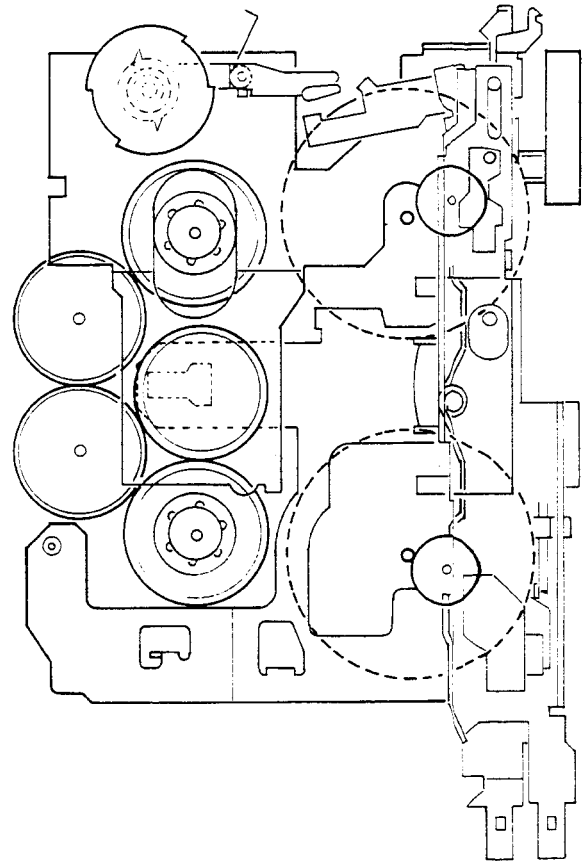


Fig. 13

Moving the NR lever up and down causes changeover among the pinch roller, FR switch, and playidler gear. With FF and REW levers having been returned, the FR lock arm returns to the normal lock position and locks the gear when the FR gear completes an one-half turn. The mute arm also returns to turn OFF the mute switch. The reverse play state is thus obtained. (The same applies to changeover from REV to FWD.)

● FF/REW Operation

(1) FWD play operation

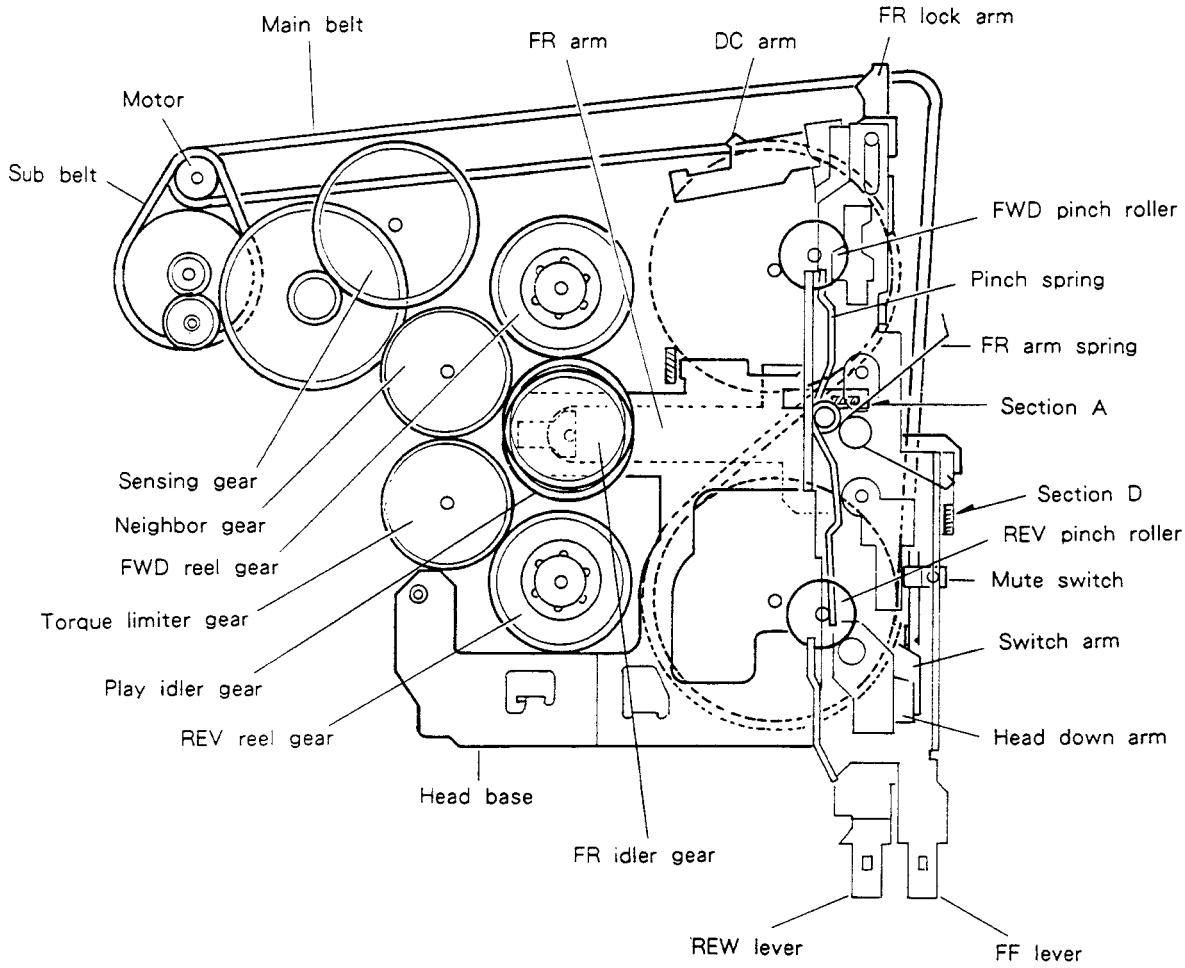


Fig. 14

In the FWD (REV) play state, the head base is fixed by a chassis stopper. The pinch spring presses the pinch roller into contact with a capstan to drive forward the tape. The REV reel gear takes up the tape via the torque limiter gear. In this case, the FR idler gear on the FR arm is centered by Section A of the head base and thus not rotating.

(2) FF Operation

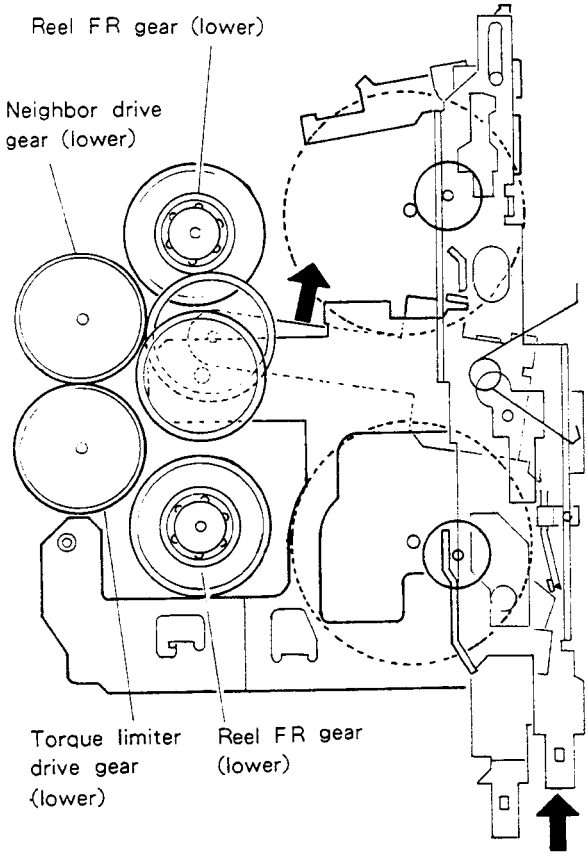


Fig. 15

FF operation is obtained by pressing and locking the FF lever. As the FF lever is pressed, the switch arm turns to turn ON the mute switch. The head base is moved backward along the FF lever cam groove.

As the head base moves backward to release the pinch roller from the capstan, the play idler gear is simultaneously disengaged from the reel gear. As the head base moves backward, the FR arm centered by Section A is put into rotation by the FR arm spring to engage with the FWD side FR gear.

The FF lever is locked by the FR lock arm and performs the FF operation. (Fig.15)

(3) REW operation

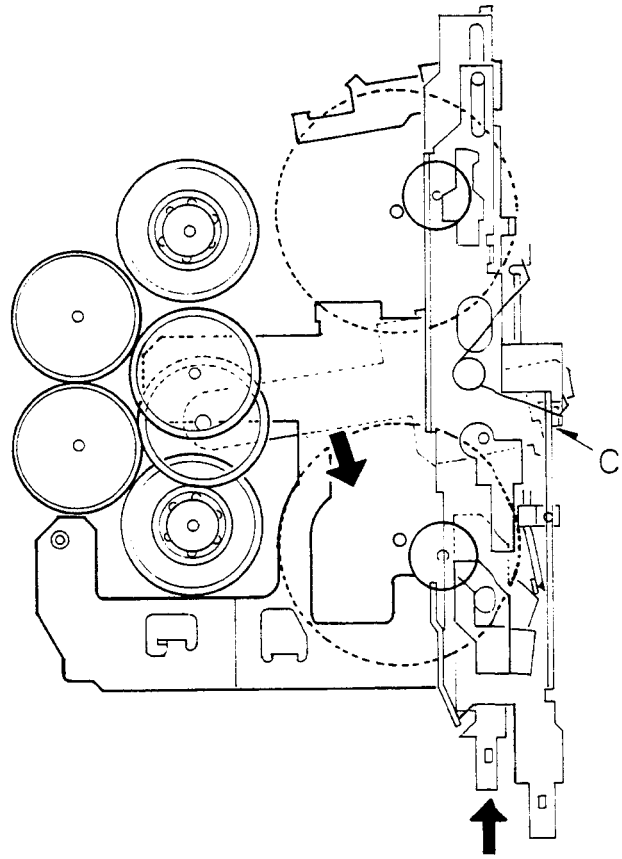


Fig. 16

Similar to the case of FF operation, pressing the REW lever causes the mute switch to be turned ON.

Simultaneously with release of the pinch roller from the capstan, the play idler gear is disengaged from the reel gear.

Section D of the REW lever presses a movable side of the FR arm spring, thereby engaging the FR gear to the FR gear on the REV side.

The REW lever is locked by the lock arm, performing the REW operation. This operation is cancelled when Section C is turned by the lever return spring. (Fig.16)

● Sensing Operation

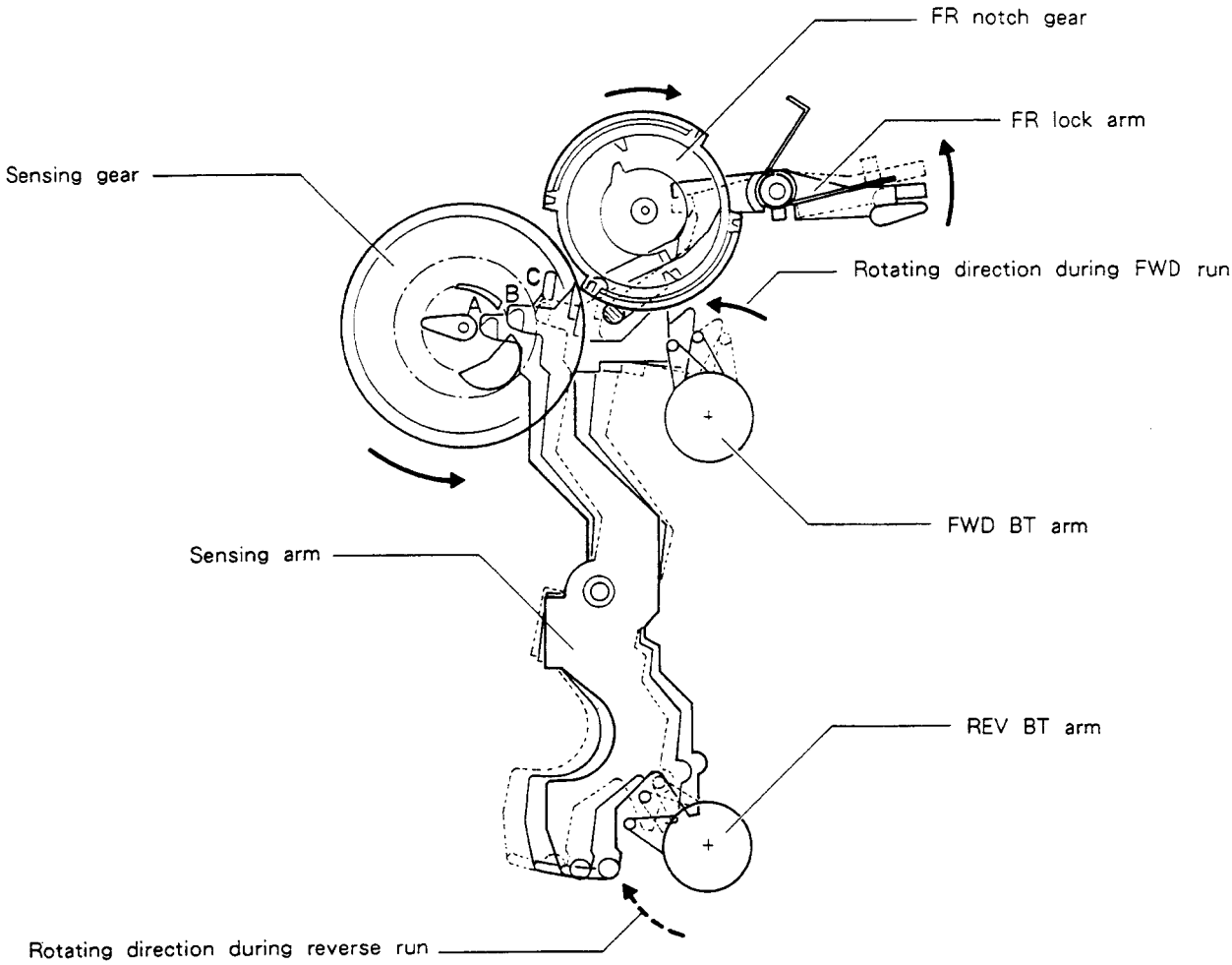


Fig. 17

1. During tape run: The sensing arm keeps oscillation between A and B under a force of the FWD BT arm (or REV BT arm).

2. At end of tape: The force of the BT arm is lost. The sensing arm stops at Position B, then pushed out to Position C by a crescent cam of the sensing gear.

3. Change of run direction:
The FR lock arm turns counter-clockwise along with movement of the sensing arm. The FR notch gear is unlocked and begins to turn.

● ATSC Opeeration

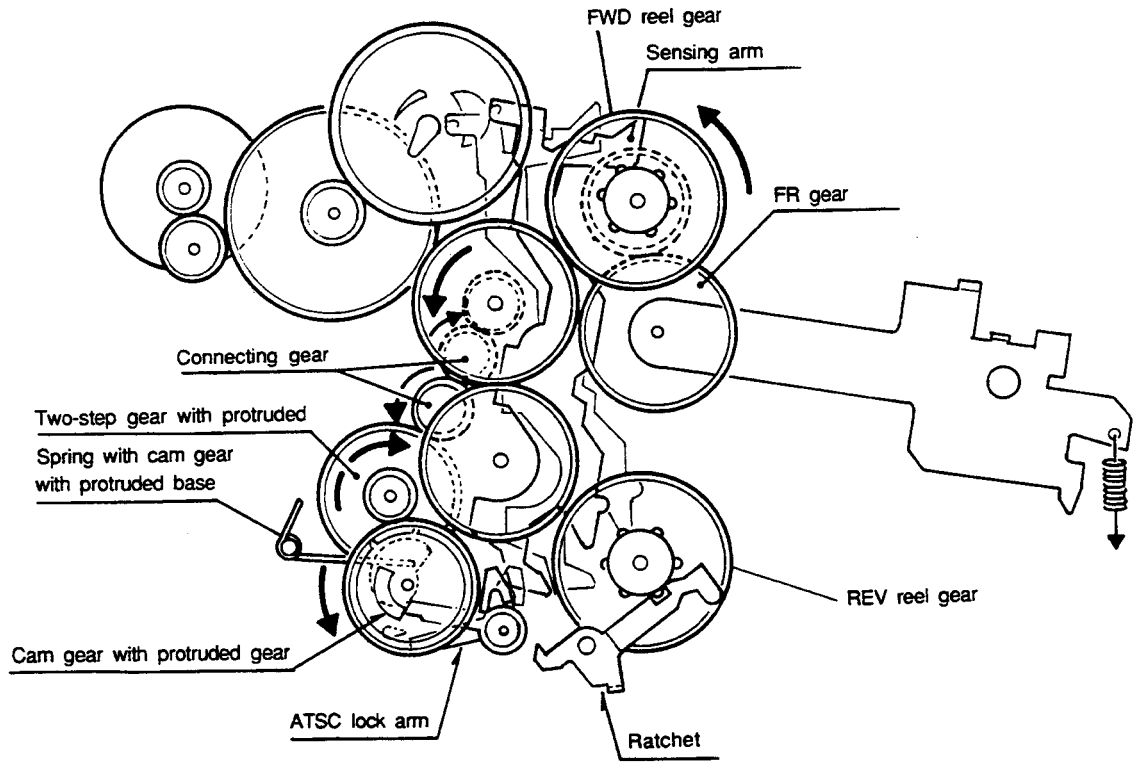


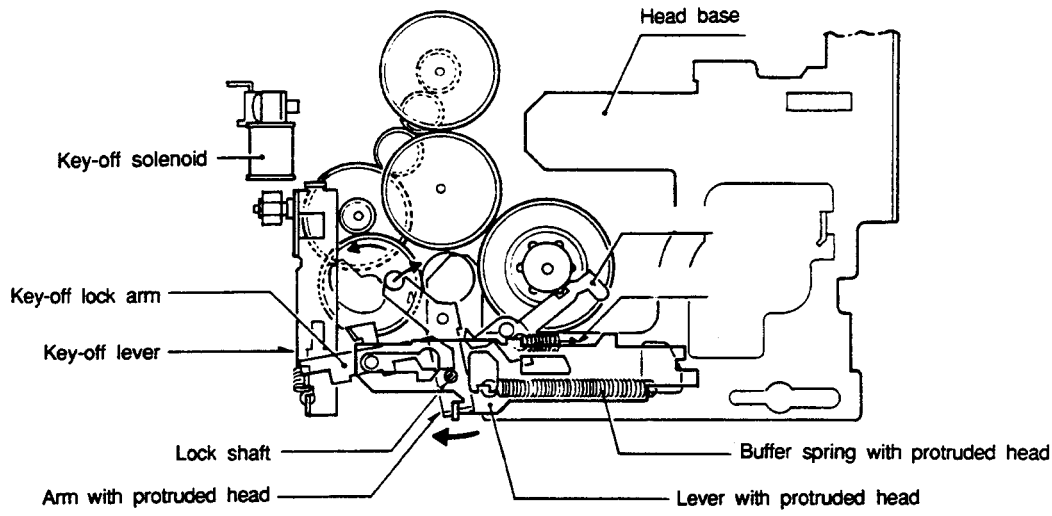
Fig. 18

1. At the position for releasing the head table, the FR gear is meshed with the FWD reel gear. Because the ratchet in the REV reel gear stops rotating, the tape must be wound up until no slack exist.

2. Because the rotation stops when no slack exists in the tape, sensing is performed. The sensing arm presses the ATSC lock arm, and the lock of the cam gear with protruded head gets out of position. Then, the cam gear is made to rotate.

● Key-off Operation

Release Condtion



Play Condition

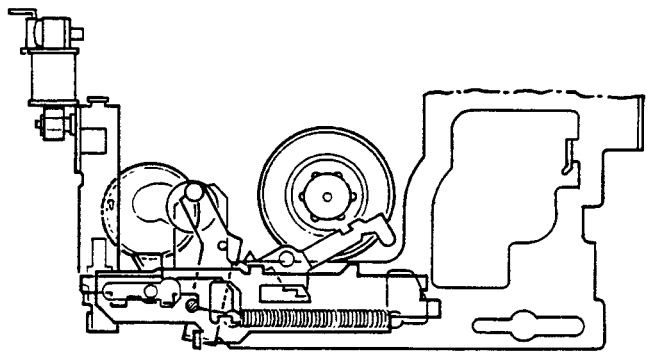


Fig. 19

1. Thrusting head: The arm with protruded head is rotated by the rotation of the cam gear with protruded head, and the lever with protruded head is pushed out. Because the lever with the protruded head and head base are connected by the buffer spring with protruded head, the head base moves forward.

2. Lock for head base:
When the lever with protruded head moves forward, the lock shaft caulked by the lever with protruded head shifts. Thus, the key-off lock arm can rotate, and the key-off lever reaches the key-off solenoid by force of a spring, and becomes attached. (Although escape power works on the key-off lock arm by force of the head return spring, the solenoid maintains it.)

3. Key-off: The key-off lock arm is rotated by the power of the head return spring when the key-off solenoid is switched off, and the lever with protruded head and head base move back together.

● EJECT Operation

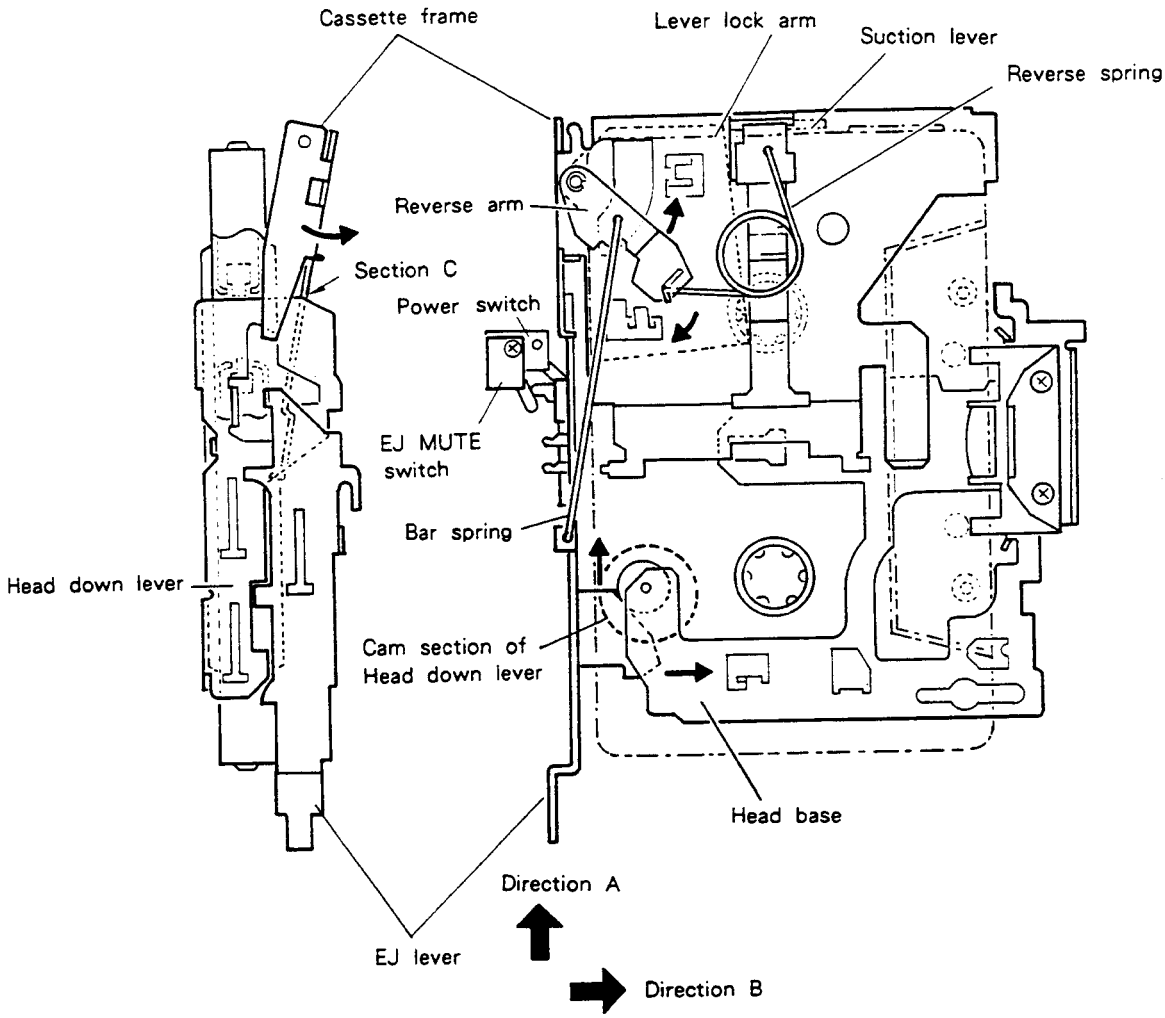


Fig. 20

1. Push the EJ lever in Direction A by hand (EJ MUTE SW ON) At the same time, the head down lever slides in Direction A.
2. The cam section of the head down lever returns the head base in Direction B (head base down operation).
3. Section C of the cassette frame is pushed up by the stroke of the head down lever (push-up operation).
4. The reverse arm is driven in a direction of arrow mark via bar spring by the EJ lever stroke.
5. The reverse spring passes through the reverse position to eject the cassette tape (eject operation).
6. With the EJ lever over-stroking, the lever lock arm can be rotated and locks the head down lever.
7. When released, the EJ lever returns and is stopped by the head down lever.

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